Competence-based employability:

A 1

25 August 2015 11:00 - 12:30

Room Green_A3

Invited SIG

Culture and education

Religious Educationís Contributions to a Reflective Society

Keywords: Culture,Morality,Multicultural education,Religious studies

Sig's: SIG 19 - Religious and Spiritual Education

Chairperson: Ulrich Riegel, Siegen University, Germany

Organiser: Arniika Kuusisto, University of Helsinki, Finland

Organiser: Ulrich Riegel, Siegen University, Germany

Discussant: Laura Hirsto, University of Eastern Finland, Finland

In terms of religion modern societies are plural. In religiously plural societies the purpose of Religious Education (RE) has changed. Instead of familiarizing students with their religious background, RE has to enable students to deal competently with religious plurality. The SIG 19 Invited Symposion tackles the requirements of such an educational approach. It will clarify the attitude of students at school as well of RE-teachers in the making at university towards religious plurality. Both presentations will show that religious pluralization is welcomed by young people of today. RE's contribution to a reflective Society may build on this attitude. Current practice of RE, however, is not able to do so. The third presentation will show that current RE fails to activate the students cognitively. Instead of making the students thinking on their own it just transmits religious knowledge. In consequence the final presentation will develop a neuroscientifically informed agenda of how religious education is able to enhance creativity in the students. This could be a contribution of RE to a reflective society beyond confessional goals.

Exploring REís potential to contribute to creativity through neuroscientific insights

Neuroscience,Cognitive skills,Culture,Morality

Terence Lovat, The University of Newcastle, Australia; Theo Van der Zee, Radboud University Nijmegen, Netherlands;

The paper will begin with the general capability statement in the new National Curriculum of Australia, a statement that includes creative thinking as a central curriculum goal. It will explore and expound on the nature, definition and pedagogical bounds of this goal, utilizing updated neuroscientific insights to inform the exploration. It will then appraise the potential of Religious Education (RE) to constitute an especial pedagogical contribution to such a goal. In terms of the goal itself, the paper will focus on notions of curiosity, wonder and imagination as features of and/or pedagogical scaffolds for the development of creative thinking. It will then move to elicit these same notions as they emerge from updated neuroscientific literature, highlighting their importance to the formation of effective cognitive functions generally and therefore to optimizing learning. The paper will argue that neuroscientific insights can help in positioning RE to play a powerful role in the development of the kind of creativity that helps to impel optimal cognition and facilitate the most effective learning across all curriculum areas.

Does cognitive activation happen in classrooms of religious education?

Qualitative methods,Video analysis,Educational technology,Teaching/instruction

Ulrich Riegel, Siegen University, Germany; Eva-Maria Wustner, University of Siegen, Germany;

Cognitive activation is regarded as basic feature of religious education (RE). But there are hardly any studies to explore whether teachers of RE act accordingly. To analyze teacher behavior we videotaped 53 lessons of RE. The assessment of cognitive activation was done by an adapted rating manual of the PERLE-Study operationalizing cognitive activation according to seven dimensions. With one exception the inter-rater-reliability of the dimensions under scrutiny is good to satisfactory ($.60 < k < .80$). The median of all dimensions is 2 or lower, indicating that most of videotyped teachers do not act in a way to activate their students cognitively. There are not significant differences between RE on primary level and on secondary level. Consequences for teacher training will be discussed.

Supporting intercultural and interreligious sensitivities in teacher education

Quantitative methods,Culture,Morality,Religious studies

Elina Kuusisto, University of Helsinki, Finland; Arniika Kuusisto, University of Helsinki, Finland; Inkeri Rissanen, University of Helsinki, Finland;

In this presentation we examine the supporting of intercultural and interreligious sensitivity in Finnish teacher education. The theoretical framework is built on Bennettís (1993) and Abu-Nimerís (2001) developmental models of intercultural and interreligious sensitivity. The empirical data was gathered from teacher students during spring 2014 at the University of Helsinki and University of Tampere. The data consists of quantitative survey data (N=144) together with reflective essays from some of the same respondents (N=39). Results from quantitative data show that these teacher students typically represent ethno- and religiorelativistic views indicating basic skills for cultural and religious encounters. Still, studentsí essays further

illuminate that they would like more information and skills on intercultural and -religious sensitivities and competences as a part of their teacher studies.

Pupilsí views of cultural and religious diversity in a pluralistic educational context

Qualitative methods,Quantitative methods,Reflective society,Religious studies

Arniika Kuusisto, University of Helsinki, Finland; Arto Kallionemi, University of Helsinki, Finland; Jorgen Straarup, Sodertorn University, Sweden;

This study examines pupilsí views of cultural and religious diversity in a pluralistic educational context. Besides immigration, the increasing polarisation of values in the society resulting for example from secularism and the growing interest in new religions has altered the children and young peopleís contexts of growing up. Although this change has been notable, there is very little up-to-date research on the children and young peopleís values related to the encountering of diversity in their everyday contexts, such as school, home and peer group. Through a mixed method research design, the findings of our parallel research projects, EDEN in Finland, and CARDIPS in Sweden and Estonia, illuminate the growing up processes behind individual development of pupils in the 3rd, 6th and 9th grades of comprehensive school. The here reported findings of the Finnish sample include survey (n=1301) and interview (n=38) data from pupils of the age groups 9ñ10, 12ñ13, 15ñ16, as well as the Swedish and Estonian surveys (n=1125 for Sweden and 750 for Estonia). The findings illustrate differences in attitudes between the genders, age groups, as well as the pupilsí area of residence. Based on these findings, it seems that the actual lived experience of cultural and religious diversity in the growing up context influences pupilsí openness to other traditions than their own.

A 2

25 August 2015 11:00 - 12:30

Room Brown_B1

Invited SIG

Comprehension of text and graphics

Bridging research and practice, interchange between basic and applied research

Keywords: Cognitive skills,Comprehension of text and graphics,Educational technology,Instructional design,Multimedia learning

Sig's: SIG 2 - Comprehension of Text and Graphics

Chairperson: Huib Tabbers, Erasmus University Rotterdam, Netherlands

Organiser: Erica de Vries, Universite Pierre-Mendes-France, France

Organiser: Huib Tabbers, Erasmus University Rotterdam, Netherlands

Discussant: Mireille Betrancourt, University of Geneva, Switzerland

This EARLI SIG 2 Invited Symposium addresses interrelations between basic and applied research. Four presentations each focus on a specific gap between research and practice in the domain of text and graphic comprehension and how it may be bridged. De Koning and colleagues concentrate on reading comprehension research and instruction through a mental simulation intervention study. Scheiter and colleagues, dealing with multimedia materials, target a better match between user needs, empirically validated learning potentials, and textbook companies' approaches to textbook production. Van den Bosch and colleagues study teachers' understanding and interpretation of graphs, as assessed with eye-tracking and think-aloud methodologies, with a view to ameliorating instructional decision-making. Finally, Groff and colleagues collaborated with experts in emergency management, with the aim of examining the potential of animated pictographic messages for comprehension of emergency instructions during international catastrophic events. Mireille Betrancourt will critically examine the four contributions in her discussion.

Taking a walk across the bridge: Effects of a mental simulation intervention study to foster reading

Experimental studies,Teaching/instruction,Comprehension of text and graphics,Reading comprehension

Bjorn de Koning, VU University Amsterdam / LEARN! Institute, Netherlands; Lisanne Bos, VU University, Netherlands; Stephanie Wassenburg, VU University Amsterdam, Netherlands; Menno van der Schoot, VU University, Netherlands;

In this study, we developed and tested a computer-based mental simulation training aimed at fostering primary school childrenís reading comprehension. It draws upon fundamental cognitive research showing that text comprehension requires readers to construct a vivid, multisensory mental representation of the described situation. In fact, there is currently ample evidence that mental simulation, i.e. the internal (re)enactment of perceptual, motor, or affective experiences, underlies deep(er) text comprehension. Despite the acknowledged potential of these insights for educational practice, little is known about how to effectively support these processes and make them of value for instructional purposes. Our training study aimed to bridge this gap. In our 4-week training (8 lessons), we made children cognizant of the importance of ìtaking a mental leap into imagined worldsî to see, feel, hear, smell, taste, and act-out the described situation. Moreover, children engaged in different exercises (e.g., cloze, matching) stimulating them to (re)enact perceptual and motor experiences and to connect these to the text content. Before and after training, we measured reading comprehension performance (standardized reading comprehension test) and reading motivation (motivation questions). Results showed that, compared to a control group following the schoolís regular reading curriculum, the training led to significant pre-to-posttest improvements in general reading comprehension levels and reading motivation. Apparently, training children to engage in mental simulation processes effectively helped them to (re)experience the text and enhance their understanding and enjoyment. So, we

show that it is possible to effectively build a bridge between fundamental reading comprehension research and reading comprehension instruction.

Bridging research and practice: An evidence-based approach to designing digital textbooks

Mixed-method research,Instructional design,Comprehension of text and graphics,Science education,Secondary education

Katharina Scheiter, Knowledge Media Research Center, Germany; Sascha Schanze, Leibniz Universitat Hannover, Germany; Juliane Richter, Leibniz-Institut fur Wissensmedien, Germany; Nina Ulrich, Institute for Science Education, Leibniz Universitat Hannover, Germany;

With the advent of tablets in education, teachers increasingly ask for digital textbooks incorporating potentials of modern media such as dynamic representations and interactive learning tasks. However, so far publishers tend to meet these demands by making available digital versions of their printed textbooks. The present project tries to provide a better match between user needs, empirically validated media potentials, and textbook companiesí approaches to textbook production. It is funded by the German Research Foundation in a funding line that focuses on fostering the transfer of scientific evidence into practice within research projects. Team members are researchers from learning sciences and chemistry education as well as representatives from two companies (a textbook publisher, a digital whiteboard company). In the presentation we will report on the following milestones within the project: (1) results from a questionnaire study with N = 355 secondary level science teachers inquiring about their attitudes towards ICT integration in classrooms, experienced barriers preventing successful integration, and wishes and needs for the future, (2) the research-driven development of adequate evaluation measures and a digital textbook prototype on introductory chemistry education, and (3) results from an in-situ pre-posttest study addressing the overall effectiveness as well as the effectiveness of individual textbook features conducted with students from more than a dozen classes. The research is supposed to feed into the development of design guidelines for textbook publishers, which will again be empirically evaluated by also testing the effectiveness of another prototype chapter developed by the publishers based on these guidelines.

Teachersí interpretation and use of CBM progress-monitoring graphs: A research-to-practice gap

Experimental studies,Teacher professional development,Teaching/instruction,Comprehension of text and graphics,Primary education

Roxette van den Bosch, Leiden University, Netherlands; Christine Espin, Leiden University, Netherlands; Siuman Chung, Leiden University, Netherlands;

When teachers use graphed progress-monitoring data for instructional decision-making, their studentsí performance improves, but teachers often do not use this type of data. Because graph interpretation can be complex, teachersí non-use of the data might be explained by graph-interpretation difficulties. In this study, using think-aloud and eye-tracking methodologies, we examined whether and how teachers (N = 23) differed in their ability to describe and interpret

CBM progress-monitoring graphs, and whether this ability was influenced by teachersí general graph-reading ability. Teachersí general graph-reading ability was assessed by a graph-reading test with graph-interpretation questions. Teachersí understanding and interpretation of CBM progress-monitoring graphs were assessed via think-aloud and eye-tracking. Teachers were shown four CBM progress-monitoring graphs: two standard researcher-made progress graphs and two progress graphs from their own students. They were asked to describe and interpret these graphs out loud, while their eye movements were registered. Analysis of think-aloud data focused on the coherence, accuracy, and completeness of teachersí description/interpretation of the progress graphs. Analysis of eye-tracking data focused on the number, order, and duration of fixations on specific elements of the graphs. Finally, the influence of general graph-reading ability on graph interpretation was examined. More detailed analyses are underway. Insight into teachersí understanding and interpretation of graphs, as assessed with eye-tracking and think-aloud methodologies, may lead to interventions that improve the use of graphed progress-monitoring data for instructional decision-making, which eventually may lead to improved student performance.

Dynamic pictographic messages: From laboratory to international disaster situation

Experimental studies,Instructional design,Comprehension of text and graphics,Out-of-school learning,Multimedia learning

Jonathan Groff, Universite de Bourgogne / Lead - CNRS, France; Jean-Yves Bassetti, Universite díAix-Marseille, France; Jean-Michel Boucheix, University of Dijon, LEAD-CNRS, France;

Previous research on the comprehension of animated graphics concerned formal learning in scientific and technical domains (Hoffler & Leutner, 2007). Our work focusses on a different application of animations: providing public and emergency information. We study, not only comprehension, but the effect of animation on decision making. Our recent research (Groff, & al., 2014), was developed according to a ìbasic research approachî in order to facilitate accessibility of public information in transportation. These studies showed that graphic information displays have the potential to deliver emergency information in situations where normal announcement types are ineffective. In this paper, we explain how we tried to solve a specific practical problem by using fundamental knowledge and by studying cognitive processes underlie by this situation. To illustrate our method, we focus on communication between victims and rescuers during international disaster (e.g. Earthquake-Indonesia, 2006). In these circumstances, victims must understand instructions given by rescuers as quickly as possible. Rescuers while trying to help in a timely and efficient way were faced with language barriers, cultural habits and religious belief (e.g. Costa-Concordia shipwreck. Passengers were from 40 countries). They need an effective communication device which would allow an efficient match to internal representations. So, we collaborated with experts in emergency management, with the aim of examining the potential of animated pictographic messages to provide comprehension of emergency instructions during international catastrophic events. We studied the effect of time pressure and cross-cultural differences on comprehension and decision making, in order to optimize our material.

25 August 2015 11:00 - 12:30

Room Green_A4

Invited EARLI

Assessment methods and tools

Modelling, Enhancing and Assessing Experimental Competence

Keywords: Assessment methods and tools,Competencies,Inquiry learning

Sig's: SIG 1 - Assessment and Evaluation

Chairperson: Susanne Metzger, Zurich University of Teacher Education, Switzerland

Organiser: Susanne Metzger, Zurich University of Teacher Education, Switzerland

Organiser: Christoph Gut-Glanzmann, Zurich University of Teacher Education, Switzerland

Discussant: Nicos Papadouris, University of Cyprus, Cyprus

Scientific Inquiry is one of the fundamental principles of science. Therefore, supporting students in order to increase their experimental skills is one of the key goals of science education. Its importance is acknowledged by several countries' educational standards. Consequently various models of experimental competence have been developed. Most of the models describe experiments as a linear chain of sub-processes, such as formulating questions, generating hypotheses, planning and carrying out experiments and analysing or interpreting data. The need to measure the entire range of experimental skills is beyond dispute, although these tests are time-consuming and costly. Particularly with regard to large-scale assessments or enhancing students' experimental competence virtual experiments are an alternative to hands-on assessments. In this symposium we focus on different approaches to model, enhance and assess experimental competence: The papers deal with experimental competence in the fields of chemistry, physics, biology, or integrated science. One paper deals with enhancing experimental methods by using virtual experiments in comparison to real ones. Another paper compares a process-based with a product-based analysis of experimental competence. Two papers are engaged in measuring experimental competence by using hands-on assessments which are rated only with regard to the products. Finally, the papers are decomposing experimental competence into sub-dimensions in different ways: while three of the papers describe experiments as a linear chain of subprocesses (see above), one of it differentiates between types of problems.

Enhancing experimental methods in the science classroom

Experimental studies,Student learning,Competencies,Science education,Secondary education,Inquiry learning

Maik Walpuski, University of Duisburg-Essen, Germany; Meike Bergs, University of Duisburg-Essen, Germany;

The importance of Scientific Inquiry for science education is mirrored in science curricula all over the world. Several studies show that Scientific Inquiry demands high standards of studentsí cognitive abilities, lab skills, and knowledge on the nature of science. For this reason Scientific Inquiry is not only a method for gaining scientific knowledge but already a learning goal in itself. In recent research projects, we focused on training Scientific Inquiry in small groups working on hands-on inquiry tasks as well as in computer-based inquiry tasks. This studyís aim is to bring together advantages from both learning environments. By evaluating different combinations of hands-on and computer-based inquiry tasks we target at developing a program that enhances studentsí experimental skills as much as possible. Therefore, all possible combinations of inquiry tasks will be tested against each other. Students from upper secondary schools in North-Rhine-Westphalia studying chemistry in their second year worked on two inquiry tasks with a partner. One of the inquiry tasks deals with a chemical content, one with a physical content, for both tasks a computer-based (virtual experiment: VE) and a hands-on (real experiment RE) version are available. To avoid sequence effects, half the pairs in each group start off with chemistry, the other half with physics. Log files and audio files are created for the computer-based inquiry tasks, while students working on the hands-on tasks are videotaped. Additionally, tests on scientific discovery processes, subject-specific knowledge, and motivation were administered in a pre-post-test design.

Process-oriented and product-oriented assessment of experimental skills in physics

Video analysis,Assessment methods and tools,Competencies,Science education,Secondary education,Inquiry learning

Nico Schreiber, University of Duisburg-Essen, Germany; Heike Theyssen, University of Duisburg-Essen, Germany; Horst Schecker, University of Bremen, Germany;

The acquisition of experimental skills is widely regarded as an important part of science education. Valid assessment procedures for experimental skills have to consider three dimensions of experimentation: prepare, perform and evaluate data. To assess experimental skills, written tests are established tools but especially with regard to the perform dimension, hands-on tests are more valid than written tests. However, in large-scale assessments the scoring of studentsí performanc-es is usually based on the products of experimenting ñ i. e. data or conclusions documented in lab sheets. Another approach is a process-oriented analysis that considers the sequence and quality of studentsí actions. This kind of assessment is time-consuming compared to a product-oriented ap-proach. The effort is justified if a process-oriented approach yields an added value for the diag-nostics of experimental skills. The aim of our study was to investigate this issue by comparing a product-oriented assessment that analyzes studentsí lab sheets with a process-oriented assessment that additionally takes studentsí videotaped actions into account. Our results show that product-oriented and process-oriented assessments are exchangeable for the diagnostics of experimental skills in the dimensions prepare and evaluate data, but not in the dimension perform an experiment.

Development and evaluation of a hands-on assessment of experimental competence in Biology

Psychometrics,Assessment methods and tools,Competencies,Science education,Secondary education,Inquiry learning

Andrea Moller, University of Trier, Germany; Doris Schmidt, University of Trier, Germany;

The diagnostic of scientific inquiry competence, especially in the context of experiments, plays an important role in science education research. It is vital for further analysis of the nature of involved cognitive and psychomotor processes in order to develop targeted promotion of specific skills in the science classroom. In the here presented study we developed and evaluated a hands-on practical assessment of experimental competence in the subject Biology that is based on theoretical models of scientific inquiry competence and meets the requirements for large-scale studies. The test instrument incorporates process based as well as status diagnostic approaches. On the basis of 52 test items in four predicted subskills ìbuilding up an experimental settingî, ìconduct measurementsî, ìdocument dataî and ìidentification of possible performance errorî, assumed to be indispensable for conducting an experiment, 330 pupils grade 8 (age 12-14) performed in two previously unknown experimental settings, each with a specific biological context. Detailed analysis of the test instrument suggests that it meets the relevant criteria and can thus be used to investigate pupilsí experimental performance competence and answer the posed research questions. Furthermore, the results already reliably support two of the four a priori predicted subskills. Practical experimental competence of girls was found to be significantly higher than in boys. Overall, interesting patterns in pupilsí achievements in the four subskills can be observed and will be presented in greater detail. Our study can thus help providing an assessment tool for individual promotion of experimental performance competence in the science classroom.

Modelling and assessing experimental competence: Interdisciplinary model for hands-on assessments

Psychometrics,Assessment methods and tools,Competencies,Science education,Secondary education,Inquiry learning

Christoph Gut-Glanzmann, Zurich University of Teacher Education, Switzerland; Susanne Metzger, Zurich University of Teacher Education, Switzerland; Pitt Hild, Zurich University of Teacher Education, Switzerland; Josiane Tardent, Zurich University of Teacher Education, Switzerland;

In Swiss compulsory schools, biology, chemistry, and physics are taught as one subject. Accordingly, the national standards do not distinguish the three sciences. In order to assess standards for experimenting an interdisciplinary competence model for practical assessments was developed. In this model the experimental competence is structured by sub-dimensions referring to different experimental problem types such as ´observation[a], ´measurement[a], ´scientific investigation[a], and ´experimental comparison[a]. The progression of competence is modelled for each problem type separately, differentiating between three to five levels in terms of quality

standards for the solution of a standardized problem. For a reduced validation six tasks were developed: three investigation tasks and three comparison tasks with biological, chemical and physical content. The validation test was administered with 331 students (grade 7, 8, and 9) of different school types. The students solved three to four tasks, each in 20 minutes. They worked on their own with printed test sheets. The results affirm that the progression models can be applied reasonably to contexts of all three science subjects. All 63 quality criteria could be rated with high interrater agreement (> .78) and, except of 8 criteria, with sufficient interrater correlation (> .61). A 1-dimensional partial credit Rasch-analysis shows for all six tasks good fit (.93 < infit < 1.09, ?T? ? .9) and high discrimination values (? .69). However, only a questionable EAP/PV-reliability (.65) is achieved. In order to improve the reliability, a multidimensional validation of the whole structure model with 24 tasks is planned.

A 4

25 August 2015 11:00 - 12:30

Room Green_A1

Invited SIG

Inquiry learning

Learning with and learning from technology-enhanced inquiry practices

Keywords: Cognitive skills,Computer-assisted learning,Inquiry learning,Science education

Sig's: SIG 20 - Computer Supported Inquiry Learning

Chairperson: Wouter R. van Joolingen, Utrecht University, Netherlands

Organiser: Astrid Wichmann, Ruhr University Bochum, Germany

Organiser: Annelies Raes, Ghent University, Belgium

Discussant: Marcia Linn, University of California-Berkeley, United States

Inquiry practices include activities that scientists engage in as they explore, explain and model world phenomena (NRC, 2012). As designers, practitioners and researchers in the context of technology-enhanced inquiry practices, we can look at student learning and learning outcomes from two perspectives. From one perspective, it is crucial to think about how students learn with tools, environments including support. We need to pay attention to the process of learning as students engage in inquiry practices. From another perspective, it is important to assess what students learn from those inquiry practices. As we try to understand what students learn, we are interested in measuring outcomes including knowledge gain and inquiry skills. We also seek to find if students become self-regulated learners as part of their 21st century skills (NRC, 2012). In line with these twofold perspectives, a challenging task for research is to understand how the

learning process is connected with learning outcomes and vice versa (Salomon, & Perkins, 1998). Linking process data and outcomes often reveal mixed results. Inquiry practices that seemed engaging and effective do not result in expected learning outcomes. Likewise, tasks that have been carried out erroneously or which are cognitively demanding result in unexpected high achievement and higher learning outcomes. Those paradoxical findings have been discussed in the literature under various labels such as desirable difficulties (Schmidt & Bjork, 1992), productive failure (Kapur & Bielaczyc, 2012), and assistance dilemma (Koedinger et al., 2008). The symposium will bring together research paying attention to both learning with and learning from inquiry practices, discussing possible tensions in between.

Fostering scientific reasoning with worked examples in a simulation-based learning environment

Experimental studies,Educational technology,Reasoning,Science education,Inquiry learning

Juliane Kant, LEAD Graduate School, Germany; Katharina Scheiter, Knowledge Media Research Center, Germany; Kerstin Oschatz, Eberhard Karls University Tuebingen , Germany;

Scientific reasoning (SR) is one of the most vital aspects of science education standards. International studies have shown that German students lack SR practices (e.g., OECD, 2007). In the wake of these studies, schools in Germany introduced domain-general science subjects that combine biology, physics etc. However, it remains unclear whether it is appropriate to foster SR in a domain-general way. Research has shown that SR can be facilitated by using simulated experiments. Worked examples (WEs) that explain the steps to solve a SR task further enhance learning. For our training we used four WEs (2 biology, 2 physics) in two sessions. We varied the factors arrangement and instructional approach of WEs. We arranged the WEs either in a domain-general (one example from each subject per session) or in a domain-specific way (two examples from the same subject per session). As instructional approach, students were either provided with a SR strategy followed by examples (abstract principle method) or they were not provided with the SR strategy but had to induce it from the examples (embedded principle method). We expected the latter approach to foster SR practices (i.e., skills) and the first approach to foster content knowledge (i.e., factual knowledge). One-hundred-and-twenty 8th graders from German high schools were randomly assigned to the four conditions. SR was assessed with an achievement test and process measures of studentsí learning with the simulated experiments. Data collection is ongoing. Results will clarify effects of using domain-general or domain-specific instructional designs on SR practices and content knowledge.

Contrasting peer-created simulation results creates extended learning opportunities for students'

Educational technology,Science education,Technology,Computer-assisted learning,Inquiry learning

Torunn Aanesland Stromme, University of Oslo, Norway; Sten Ludvigsen, University of Oslo, Norway;

The aim of the current case study is to provide insight into how students use other studentsí simulation data in refining their own simulation data, as well as what learning opportunities are created as a result of a compare-and-contrast task. A new feature embedded in a computer simulation allows students to share data sets as well as to critically examine other studentsí data sets as a means of refining their own data set. The participants in this case study were 20 students in a general science course (Grade 11) in an upper secondary school who worked for 20 hours on a group project on energy supply and heat loss in low-energy buildings. The project was facilitated by a computer-based learning environment. We analyze in detail the interactions within the student groups while they examine each otherís simulation data, and we apply two main analytical concepts: conceptual framing and positional framing, which target how students choose to work together and what they focus on. Our results reveal that the selected student groups framed the activity differently. They focused on different features (parameters or output factors) of the simulation, which create different opportunities for learning. Depending on how the students choose to frame the task creates different opportunities for the students to problematize scientific questions, recap earlier shared arguments, problematize specific concepts, and explore premises for comparing simulation results.

Interactions between task difficulty, interest and learning outcomes in inquiry-based science

Quantitative methods,Educational technology,Science education,Inquiry learning

Tomi Jaakkola, University of Turku, Finland; Koen Veermans, University of Turku, Finland;

Little is known about the effects that inquiry-environments have on students' interest, and even less on the interaction between interest and learning outcomes. In the present study 164 4th to 7th grade students constructed and studied electric circuits for 90 minutes in a computer-based simulation environment. Circuit elements remained concrete (Concrete condition) throughout the session or switched to abstract (Switch condition) during the session. Domain knowledge was measured before and after the intervention and studentsí subjective experiences of task difficulty and situational interest were measured four times during the intervention. A significant amount of learning was observed on each grade level, suggesting that learning from the simulation was successful at all levels. No differences in learning were detected between the conditions, except that the students reached higher understanding one grade earlier in the concrete condition (5th) than in the switch condition (6th). Students reported high levels of interest throughout the intervention in both conditions, hence also suggesting successful learning with the simulation. SEM models suggest that, at least in the present settings, learning outcomes weren't directly dependent on interest and also revealed different interaction patterns for three learning outcome clusters. Taken together, the results show that the present kind of interactive computer-based inquiry learning environments can be highly engaging and productive across multiple grade levels, independent of the perceptual concreteness of the simulation elements. They also suggest that more research on the interaction between interest and learning outcomes is needed in longitudinal settings.

Using tablet devices during inquiry learning: The role of the teacher

Peer interaction,Science education,Computer-supported collaborative learning,Inquiry learning

Hannelore Montrieux, Ghent University, Belgium; Annelies Raes, Ghent University, Belgium; Tammy Schellens, Ghent University, Belgium; Ellen Vanderhoven, Ghent University, Belgium;

In this paper we discuss the role of teachers in technology-enhanced inquiry learning. An intervention study with 140 pupils and their science teachers (n=3) has been conducted in one of the first secondary schools in Belgium that has implemented tablet devices into the whole school and classroom organization since September 2012. Three different macro scripts (Dillenbourg et al., 2009) are implemented and compared in a quasi-experimental design. In the first condition, activities alternated between group level (inquiry tasks in pairs) and class level (plenary instruction by the teacher). In the second condition, the group level was dominated, as pupils had to work on inquiry tasks in pairs without plenary instruction. In the third condition only plenary instruction with the tablet used as ëbook behind glassí was given. The impact of the different macro scripts on pupilsí knowledge achievement, inquiry skills and perceived teacher support are investigated. The results show that pupils achieve better results on the knowledge test in the conditions where the teacher intervened on the plenary, class level F(2,118)=4.78, p=.01). Moreover, students who perceived more structure, archieved better knowledge F(1,126)= 4.99, p.05). Besides knowledge acquisition, results show that condition has a significant impact on enhancing the inquiry skills (F(1,119) = 3.90, p=.02). Teacher-led class interventions at the whole-classroom plenary level are found to positively affect the inquiry skills and perceived provision of structure. In conclusion, the role of the teacher cannot be ignored in technology-enhanced inquiry learning.

A 5

25 August 2015 11:00 - 12:30

Room Green_A7

Invited SIG

Instructional design

Gesture-based learning from static/dynamic visual information

Keywords: Comprehension of text and graphics,Computer-assisted learning,Educational technology,Instructional design

Sig's: SIG 7 - Learning and Instruction with Computers

Chairperson: Steffi Zander, Bauhaus-Universitat Weimar, Germany

Organiser: Steffi Zander, Bauhaus-Universitat Weimar, Germany

Organiser: Vincent Hoogerheide, Erasmus University Rotterdam, Netherlands

Mobile devices with touch screens, such as tablets or smart phones are increasingly used in educational settings. Pragmatic advantages are seen in increased mobility during computer-based learning due to a high portability of devices and accessibility to the internet and learning apps at places in and outside classrooms, and in a potential for more fun and higher adaptivity while learning. From the perspective of educational and cognitive psychology it is of special interest to study how the altered, with respect to more natural ñ embodied ñ ways of interaction with learning materials (e.g. via touch screens) affect performance, motivation & emotion. Because the use of gestures has been shown to improve learning of other kinds of tasks, it is an interesting question of whether ñ and under which conditions- it can also improve learning from static and dynamic visual information, e.g. text, 2D and 3D visualizations. Thereby, the effects of gestural interaction with learning material in different presentations modes (text, 2D, 3D) needs to be investigated in regard to the influence of different domains and learner prerequisites. Moreover, the tracking of the gesture-based input can reveal innovative data about the underlying cognitive processes for specific tasks (e.g. spatial tasks) and can further be used to design adaptive training in such tasks. The symposium aims in bringing together researchers who investigate how gestures affect performance, motivation and /or emotions and to discuss the findings, advantages and expectations related to the theme.

Getting the point: Pointing and tracing gestures with the index finger enhance learning

Experimental studies,Quantitative methods,Instructional design,Comprehension of text and graphics

Paul Ginns, University of Sydney, Australia;

Cognitive load theory (CLT) seeks to generate novel instructional designs through an evolutionarily informed focus on human cognitive architecture including a limited working memory; however, the potential for enhancing learning through non-visual or non-auditory working memory channels is only just beginning to be appreciated. Burgeoning research informed by embodied cognition perspectives indicates pointing and tracing gestures may enhance learning due to synergistic effects on attentional processes when visual, auditory, and/or tactile inputs are synchronised (for a review, see Talsma, Senkowski, Soto-Faraco, and Woldorff, 2010). Based on Montessoriís (1914) arguments for learning the alphabet by tracing ìsandpaper lettersî with the index finger, initial studies found beneficial effects for letter learning (Hulme, Monk, & Ives, 1987), and more recently for learning to recognize geometric shapes (Kalenine, Pinet, & Gentaz, 2011). In this presentation, I review more recent experiments informed by CLT, demonstrating the positive effects of pointing and tracing gestures when learning from static visualizations combined with text. Tracing effects have now been generated across a wide range of age groups, and a wide range of topics varying substantially in complexity (e.g. recognizing letters and geometrical shapes; high school geometry; human physiology). While the tracing effect thus appears to be robust and easily implemented for novice learners, there remains much to be learned about the cognitive processes underpinning its effectiveness; its potential interaction with other cognitive load theory effects (e.g. split attention; modality; element interactivity; expertise reversal); and the degree to which these effects hold when visualizations are dynamic rather than static.

The cognitive benefits of Co-thought gestures in physical and virtual problem-solving contexts

Experimental studies,Quantitative methods,Instructional design,Comprehension of text and graphics,Problem-based learning

Wim Pouw, Erasmus University Rotterdam , Netherlands; Tamara Van Gog, Utrecht University, Netherlands; Rolf Zwaan, Erasmus University Rotterdam, Netherlands; Fred Paas, Erasmus University Rotterdam/University of Wollongong, Netherlands; Charly Eielts, Erasmus University Rotterdam, Netherlands;

Co-thought gestures (i.e., gestures that accompany quiet thinking) are a natural phenomenon occurring in a wide variety of problem-solving contexts (e.g., counting coins, solving fraction problems, and mental rotation tasks). Yet, whereas co-speech gestures have been extensively studied, the cognitive function of co-thought gestures is understudied and far from understood. Here we assessed if co-thought gestures (spontaneous or instructed) improve performance in a physical and virtual problem-solving context (Experiment 1a: Tower of Hanoi; Experiment 1b: chess) in comparison to participants who did not gesture, and whether that effect depends on visual working memory capacity (hereon VWM). On the basis of an embedded/extended perspective on gestures and cognition (Pouw et al., 2014), we hypothesized that gestures were more likely to arise (GESTURE PRODUCTION HYPOTHESIS) and positively affect (GESTURE EFFECT HYPOTHESIS) problem solving when cognitive resources are taxed (i.e., for low VWM participants and in more difficult trials). In both experiments we found evidence for the gesture effect hypothesis. Namely, co-thought gestures (spontaneous and instructed) were positively affecting performance under the condition that the task was difficult and VWM was low. Additionally, more difficult tasks had higher gesture likelihoods, but no effect of VWM was found; as such, we could not confirm the gesture production hypothesis. A second experiment (2a) is being conducted to replicate and extend the findings from Experiment 1a with children.

Embodied interaction with visual, spatial and conceptual learning contents

Experimental studies,Quantitative methods,Instructional design,Comprehension of text and graphics

Romy Bromme, Knowledge Media Research Center, Germany; Birgit Brucker, Knowledge Media Research Center, Germany; Peter Gerjets, University of Tuebingen, Germany;

Prior research indicated that stimuli near the hands affect the processing of various codalities and contents. Whereas spatial and mostly all visual contents (except for colors) presented in a pictorial codality are processed with greater attentional engagement and prioritization near the hands, processing of semantic contents in a verbal codality seems to be decreased. Our current study investigated whether the enhanced near-hand processing of pictorial visual and spatial contents holds also true for the verbal codality. Participants read texts with spatial, visual (color information) and conceptual contents while either touching them at both sides of the texts or while laying their hands on their lap (2 x 3-within-subjects design). Verbal and pictorial learning outcome measures where obtained. Preliminary results showed that conceptual contents were

better remembered in a verbal test, whereas visual and spatial contents yielded better results in a pictorial test when texts were presented near the hands.

Rotate it! ñ Measuring and training the dynamics of mental and physical rotation ability

Experimental studies,Mixed-method research,Quantitative methods,Educational technology

Sven Bertel, Bauhaus-Universitat Weimar, Germany; Stefanie Wetzel, Bauhaus-Universitat Weimar, Germany; Christoph Halang, Bauhaus-Universitat Weimar, Germany; Helmut M. Niegemann, Goethe-Universitat Frankfurt, Germany;

This contribution reports on the project Rotate it! and on an iOS app for iPads, which target mental and physical rotation abilities of elementary school students. The projectís general aim is to further an inclusive training of studentsí spatial abilities with the help of adaptive training applications on mobile devices. In the current project phase, we are aiming at mental and physical rotation tasks and are currently focusing on logging and classifying the dynamics of studentsí individual physical stimulus manipulations. Stimuli consist of 2D-arcball projections of 3D-wireframe stimuli, which were adapted from the classical Vandenberg & Kuse (1978) test of mental rotation ability. In order to gather interaction data about student- and task-specific manipulations and of screen gestures which were performed to rotate stimuli, we conducted a first Rotate it! study with 58 students (age 9-10). In a mixed method within- and between-subjects design, the study compared performance data between an app- and a paper-based version of the rotation tasks. While the paper condition required mental rotation alone, the app condition combined mental and physical rotation. At the symposium, we will report on novel, suitable measures for capturing rotational stimulus dynamics and associated screen gestures, on typical rotational trajectories of successful and unsuccessful trials, on differences between student groups, and on the comparison between app-based and paper-based testing. We will conclude with direct implications of our work for an app-based, interactive training of elementary school studentsí mental rotation abilities in particular, and of mental spatial abilities in general.

A 6

25 August 2015 11:00 - 12:30

Room Brown_B2

Invited SIG

Classroom discourse

Argumentation in long-term educational programs: Skill acquisition or becoming a citizen?

Keywords: Argumentation,Citizenship education,Computer-supported collaborative learning

Sig's: SIG 26 - Argumentation, Dialogue and Reasoning

Chairperson: Armin Weinberger, Saarland University, Germany

Organiser: Baruch Schwarz, Hebrew University, Israel

Organiser: Armin Weinberger, Saarland University, Germany

Discussant: Clark Chinn, Rutgers University, United States

Scientists interested in argumentation in school have traditionally belonged to two different camps: learning to argue and arguing to learn. The "learning to argue" camp was rather developmental as researchers generally checked argument(at)ive skills at different ages, and the arguing to learn was checked in a very short period with students inexperienced in argumentation. In the last years, both camps have elaborated long-term programs. Deanna Kuhn has elaborated with her collaborators 3 years long programs to develop argumentative skills through dialogic argumentation have yielded impressive results. Armin Weinberger, Thomas Puhl and their team represent a direction that has recognized the potential of computerized tools in developing the argumentative skills. A very different direction that Sarah Michaels, Cathy O'Connor and Lauren Resnick have adopted is Accountable Talk in which argumentation is not explicitly articulated as central but which is clearly omnipresent: Talk is accountable not only to the other or to knowledge but to standards of reasoning (also called accountability to rigorous thinking). The ultimate goal in Accountable Talk is the elaboration of a deliberative democracy, not of individual argumentative skills. Susan Mayer adopts a similar direction in capitalizing on classroom talk to foster democratic values. While Baruch Schwarz has adopted the tenets of Accountable Talk in the Kishurim program, he capitalizes on CSCL tools to help students maintaining deliberate argumentation and teachers to facilitate this maintenance, especially in a complex multicultural context in which subgroups with different ethnicities, religious affiliations, engage in argumentative activities that partly involve their identities.

Dialogic argumentation as a bridge to individual argumentive thinking and writing

Conversation/ Discourse analysis,Teaching/instruction,Argumentation,Writing/Literacy,Secondary education,Cooperative/collaborative learning

Deanna Kuhn, Columbia University, United States;

Argumentation has been claimed to be ìthe more general human process of which more specific forms of reasoning are a partî (Oaksford, Chater, & Hahn, 2008). In the USA, recent years have seen a rapidly increasing emphasis on argument skill as an educational goal. The educational context in which argument is most often practiced and assessed is individual expository writing ñ a skill that teachers routinely report as their most challenging to teach and one in which students typically perform poorly. It becomes increasingly important with advancing grade and by the post-secondary level is crucial to academic success. We describe the dialogic method we have developed to foster young adolescentsí argument skills (Kuhn, Hemberger, & Khait, 2014). Its

essence is to engage students in rich and extended dialogs with one another on significant topics. We review evidence that the method, implemented in extended form over two or more years, produces positive outcomes in argumentive discourse, in individual writing, and in meta-level understandings of argumentative discourse and evaluations of argument. In this presentation, I elaborate on these results and on the promise and challenges the method poses.

Fostering socio-cognitive conflict and argumentation in facebook-based seminar discussions

Conversation/ Discourse analysis,Educational technology,Argumentation,Social sciences,E-learning/ Online learning,Computer-supported collaborative learning

Thomas Puhl, Saarland University, Germany; Dimitra Tsovaltzi, Saarland University, Germany; Armin Weinberger, Saarland University, Germany;

Social Media like Facebook have become new arenas for argumentation and may be repurposed for learning. To address the impact of these new cultural practices of sharing in social networks, it is necessary to conduct long-term studies and to understand argumentative processes beyond isolated technology-based learning environments: what influences them, if and how they can be repurposed for learning. Such studies can contribute to the longstanding interest in argumentation in the learning sciences and can provide insights on how argumentation scripts are internalized over time. Social networking sites provide an opportunity to investigate, but also foster argumentative processes on a larger scale. Argumentation scripts and group awareness may foster patterns of online exchange that consider the rational implications of the arguments, and that pronounce the responsibility towards the group. This 2?2 field study (N=105) aims to extend knowledge about analyzing and supporting argumentation processes by examining how Facebook can be harnessed for argumentative learning through group awareness tools (with vs. without) and argumentation scripts (with vs. without). We find main effects for both conditions on processes of argumentative knowledge construction and domain-specific knowledge. We show and discuss how argumentation practices are being increasingly shared among a class of learners over the course of nine weeks when appropriately supported.

Accountable talk moves and the democratic construction of classroom understandings

Conversation/ Discourse analysis,Teaching/instruction,Argumentation,Science education,Secondary education,Knowledge creation

Sarah Michaels, Clark University, United States; Catherine O'Connor, Boston University, United States; Susan Mayer, Critical Explorers, United States;

This paper considers the productive teacher discourse moves characterized within the Accountable Talk framework (e.g., Michaels et al., in press; O'Connor et al, in press) in relation to the three phases of collaborative knowledge construction processes that Mayer has recently theorizedóFraming, Developing, and Evaluating (Mayer 2012, in review). As the paper explains, each of these two complementary theoretical frameworks has been derived empirically and is philosophically rooted in democratic principles of joint knowledge construction processes. The

authors first trace the development of the Accountable Talk framework (AT) and review available research illuminating the outcomes of the use of AT teacher talk moves within classrooms. Mayerís FDE framework is then introduced in order to theorize the various ways in which these teacher talk moves can be seen to support students as they learn to 1) Develop their own and their classmatesí ideas and theories in relation to each other and in view of possible challenges and 2) collaboratively Evaluate various claims and arguments against available evidence within different disciplinary frameworks. By asking that their students clarify and extend their thinking, connect that thinking to the ideas and claims of others, and consider competing arguments and the evidence behind them, teachers position their students as disciplinary thinkers. In learning how to think as historians, mathematicians, and scientists do, students also learn something about the commitments and principles that underlie all democratic knowledge construction processes.

Learning to argue in multicultural classrooms

Conversation/ Discourse analysis,Cultural diversity in school,Argumentation,Citizenship education,Secondary education,Multicultural education

Baruch Schwarz, Hebrew University, Israel;

So far, research on the learning effects of types of classroom dialogue has neglected so far the cultural diversity of the classroom. Topics confronting different identities and involving deep emotions are not considered. The classroom is considered as an entity in which differences are about opinions, skills or knowledge, not ethic or social identities. Also, research mostly focuses on short-term experiments during which new norms of dialogue cannot be instilled. These shortcomings limit the scope of the results obtained so far. The multicultural and multi-ethnic Israeli context provides an interesting test-bed for broadening research on classroom talk for learning in long-term programs. We describe a one-year long program implemented in Israel in a multi-cultural context. Jews and Arabs from the same school learned about civic education. Some of the topics they learned about during the course involved conflicting identities. Other topics encouraged students with different ethnicities to collaborate. We will show that the participation to successive discussions helped establishing a democratic community. Technologies played a crucial role in avoiding numerous breakdowns and in reflecting on the quality of dialogues. Also, deliberative argumentation was often adopted but led at times to disputes. Consensual argumentation was often instigated by the teacher and deliberately maintained by discussants. We conclude that the establishment of a democratic community in multi-ethnic/cultural classrooms involve intentional alternation of deliberative and consensual talk.

A 7

25 August 2015 11:00 - 12:30

Room Brown_B6

Symposium

Self-efficacy

Self-efficacy in the classroom

Keywords: Mathematics,Primary education,Quantitative methods,Self-efficacy,Teacher professional development,Writing/Literacy

Sig's: SIG 8 - Motivation and Emotion

Chairperson: Mikko Aro, University of Jyvaskyla, Finland

Organiser: Mikko Aro, University of Jyvaskyla, Finland

Organiser: Helena Viholainen, University of Jyvaskyla, Finland

Discussant: Anna-Maija Poikkeus, University of Jyvaskyla, Finland

Self-efficacy, the beliefs one holds in ones capabilities, has gained increased interest in educational research. Learner self-efficacy has been shown to be related to achievement and persistence in learning. On the other hand, teacher self-efficacy is considered a key belief that influences teachersí professional practices and student learning. This symposium combines presentations on self-efficacy of pupils and teachers. The presentations cover the relation between self-efficacy and early skill development, as well as the sources of skill-related self-efficacy. From the point of view of teacher self-efficacy, the domain of inclusive education is at focus. The symposium advocates better understanding on the scarcely studied topics of self-efficacy in primary school-age, its relation to early learning of reading and math, and the role of teacher self-efficacy in implementing inclusive education. Altogether, the presentations cover a range of topics highly relevant for developing efficient educational practices supporting early skill development and motivation, especially with children in need of more intensified support.

The relation between self-efficacy beliefs and mathematical skills in primary school children

Quantitative methods,Student learning,Self-efficacy,Mathematics,Primary education,Motivation and emotion

Pilvi Peura, University of Jyvaskyla, Finland; Helena Viholainen, University of Jyvaskyla, Finland; Tuija Aro, University of Jyvaskyla, Finland; Tuire Koponen, Niilo Maki Institute, Finland; Riikka Sorvo, University of Jyvaskyla, Finland; Mikko Aro, University of Jyvaskyla, Finland;

Beliefs people hold about their capabilities, and about the outcomes of their efforts significantly influence their learning, motivation, and achievement. Self-efficacy beliefs have been found to predict academic achievement, however, existing studies offer us only limited understanding of how these beliefs work in primary school children. The aim of the present study was explore the relationship between self-efficacy beliefs in mathematics and mathematical skills in primary

school children and in addition, gender- and age-related differences in the relation between self-efficacy and skills. Participants of the study were 1326 primary school children (8-12 years) from 19 primary schools in Finland. Childrenís mathematical skills were assessed in addition fluency and self-efficacy in a domain- and task-specific level. A 3-way ANOVA was used to examine the main effects and interactions of the level of self-efficacy, gender and age on mathematical skills. The results indicated that the level of self-efficacy in math was related to the mathematical skills: children with low self-efficacy performed lower in mathematical task. These results confirm the finding from the earlier studies that self-efficacy beliefs are related to the mathematical skills of the students but more importantly it suggests that this is evident already in the very early years of schooling. These findings suggest that we should pay attention to the beliefs children hold about their capabilities in mathematics, especially when children are struggling with mathematics and to design learning contexts and interventions that efficiently support optimistic and positive self-efficacy beliefs.

Development of mathematics self-efficacy in early adolescence

Quantitative methods,Student learning,Self-efficacy,Mathematics,Primary education,Motivation and emotion

Ellen Usher, University of Kentucky, United States; Gwenaelle Joet, Universite Pierre Mendes France, France;

The purpose of this study is to examine how diverse efficacy beliefs in mathematics, and the hypothesized sources of self-efficacy, change over the course of a school year and to determine whether variations in studentsí mathematics self-efficacy or the sources of self-efficacy were related to gender, race, SES, or grade level. Students (N = 367) in Grades 4-6 attending two elementary and one middle school in the eastern U.S. responded to questions about their self-efficacy and sources of self-efficacy in mathematics at three time points during one academic year. Multilevel growth models revealed that mathematics skills self-efficacy changed significantly over time, but studentsí general and self-regulatory efficacy beliefs remained stable. Students reported more mastery experiences and fewer adverse physiological states in mathematics over time. Vicarious experience and social persuasions remained stable. Students whose initial scores in mathematics were better and students in lower grade levels reported higher skills self-efficacy, more mastery experience, and lower adverse physiological arousal. Findings did not reflect the decline in self-beliefs over time as reported by previous researchers. Future directions for research are suggested.

Self efficacy mediates the effect of background variables on teacher attitudes on inclusion

Quantitative methods,Special education,Teacher professional development,Attitudes and beliefs,Self-efficacy

Olli-Pekka Malinen, Niilo Maki Institute, Finland; Hannu Savolainen, University of Joensuu, Finland;

There has been a growing interest towards studying teacher self-efficacy in the domain of inclusive education. Attitudes can be seen as a major barrier for inclusive education and research has shown that teacher attitudes are often based on practical concerns about implementing inclusive education. Several studies have found a positive connection between teacher self-efficacy and perceptions related to inclusive education. This study aims to test weather teacher efficacy mediates the effects of training, experiences or knowledge on inclusive education on attitudes. A total of 855 Finnish elementary and junior secondary teachers responded to questionnaires with background questions and scales measuring attitudes and teacher self-efficacy. Path analysis using MPLUS 7.2 was employed. Training, experiences or knowledge on inclusive education predicted attitudes and teacher self-efficacy. Much of their effect on attitudes was mediated by self-efficacy. Gender predicted also self-efficacy, in particular in behaviour management. Efficacy in collaboration was the strongest mediator for the effect of background variables on attitudes. The major implication of the findings is that in order to change teacher attitudes towards inclusion, teacher education programmes should concentrate on providing teachers with knowledge, but also experiences and training on inclusive education, and to improve their self-efficacy to implement inclusive practices.

Calibration of self-efficacy in reading fluency among primary school children

Quantitative methods,Student learning,Self-efficacy,Writing/Literacy,Primary education,Motivation and emotion

Helena Viholainen, University of Jyvaskyla, Finland; Tuija Aro, University of Jyvaskyla, Finland; Pilvi Peura, University of Jyvaskyla, Finland; Riikka Sorvo, University of Jyvaskyla, Finland; Mikko Aro, University of Jyvaskyla, Finland;

Optimistic beliefs of oneís capabilities to successfully complete an academic task are needed to ensure effort and persistency in demanding learning situations. However, too high overestimation, which has been shown in adolescents with learning difficulties, may prevent learning. Whether these overoptimistic self-efficacy beliefs are characteristic to primary school children was the focus in this study. First, in an estimation task of reading fluency, the participants (N=1212; 593 girls, 619 boys) from grades 2ñ5 evaluated how far they could read a text in 30 seconds. Second, in a reading task participants had to read aloud a similar text. Reading score was standardized within the grade level in order to form three skill level groups: Dysfluent Readers, Average Readers and Fluent Readers. Analysis of variance was used to test the effects of gender, grade and skill level in estimation accuracy (=proportional difference between estimation and performance). We found that primary school age children overestimated their skills, and the greatest estimation bias was observed among 2nd, 3rd and 4th grade Dysfluent Readers. This was partly explained by the larger variation of the estimations within these groups. Interestingly, this estimation bias was skill-specific, i.e. there were no differences in addition fluency estimations between reading-skill level groups. We suggest that teachers could support children to calibrate their skills more accurately by giving realistic and accurate feedback about the skills and skill development. This can be presumed to promote motivation and persistence for learning.

25 August 2015 11:00 - 12:30

Room Cyan_F2

Symposium

Teacher professional development

Powerful learning environments in teacher education

Keywords: Competencies,Higher education,Pre-service teacher education,Student learning,Vocational education

Sig's: SIG 11 - Teaching and Teacher Education

Chairperson: Douwe Beijaard, Eindhoven University of Technology, Netherlands

Organiser: Stella van der Wal-Maris, Eindhoven University of Technology/ Marnix Academy, University of Applied Sciences, Netherlands

Organiser: Maartje Swinkels, Eindhoven University of Technology, Netherlands

Discussant: Jukka Husu, University of Turku, Finland

Society is changing rapidly and asks for education and teachers that fit present-dayís societal demands. Teacher educators have to design new and powerful learning environments to support student teachersí development of new competencies. In this symposium, the four presentations have in common a view on student teachersí learning as active knowledge construction, aiming at the development of higher order thinking skills, such as being able to acquire knowledge, to reflect critically on it, and to use it in various practical contexts. For example, all four examined learning environments aim for student teachers learning analytical and critical thinking skills through engaging them in research-oriented tasks, individually as well as collaboratively. However, the research focus in each presentation differs; each presentation deals with another aspect of learning environments that are recently implemented in teacher education. Van der Wal-Maris and colleagues explored how meaning-oriented learning is enhanced in new academic trajectories in primary teacher education. Swinkels and colleagues investigated whether a newly designed learning environment in technical teacher education results in sooner and more learning-focused teaching behaviour by the student teachers involved. The focus of Niemi and colleagues is on how the use of authentic research studies contributes to student teachersí professional competencies in primary and secondary teacher education. Baeten and colleagues investigated the effects of student-centred teaching methods on student teachersí approaches to learning, comparing different learning environments in (pre-)primary and lower secondary teacher education.

Academic primary teacher education: A powerful learning environment for meaning-oriented learning?

Qualitative methods,Pre-service teacher education,Student learning,Learning approaches,Higher education

Stella van der Wal-Maris, Eindhoven University of Technology/ Marnix Academy, University of Applied Sciences, Netherlands; Gonny Schellings, Eindhoven University of Technology, Netherlands; Douwe Beijaard, Eindhoven University of Technology, Netherlands; Jeannette Geldens, De Kempel, University of Applied Sciences, Netherlands;

This study explores the ways meaning-oriented learning is enhanced in academic primary teacher education, a new route to the teaching profession in the Netherlands. Previous research shows that most prospective teachers possess application- and reproduction-oriented learning patterns, while a meaning-oriented learning pattern is a prerequisite for becoming a professional teacher. Dutch academic primary teacher education aims at developing a meaning-oriented learning pattern by integrating teaching and scientific competencies. Student teachers (n = 32) and staff members (n = 18) were interviewed about the learning environments that have been created for this route. Interviewees outlined important ways of enhancing meaning-oriented learning, such as supporting students to structure and critically process input. Other essential aspects highlight the specific characteristics of academic primary teacher education. Examples of the latter are the interlinking of professional and scientific education, focusing students on their future professional roles, and sharing constructed knowledge with educational professionals. Realizing an acceptable study load, increasing coherence among curriculum parts (content and pedagogy) and promoting reflection by student teachers on both their teaching and scientific competence growth will further facilitate the development of a meaning-oriented learning pattern. In all, according to student teachers and their educators, enhancing meaning-oriented learning is facilitated in the learning environments designed for academic primary teacher education.

Learning to teach in a learning environment with an explicit focus on student learning

Comparative studies,Video analysis,Pre-service teacher education,Student learning,Higher education,Integrated learning

Maartje Swinkels, Eindhoven University of Technology, Netherlands; Maaike Koopman, Eindhoven University of Technology, Netherlands; Douwe Beijaard, Eindhoven University of Technology, Netherlands;

This study investigated the outcomes of an educational design in teacher education which intends to foster learning-focused teaching. The designed learning environment was characterized by the use of authentic contexts, authentic tasks and reflective dialogues. The teacher activities of student teachers (n=12) in this experimental learning environment were compared to those of student teachers (n=10) in the regular environment. Data about STsí teaching behaviour were collected by means of video-observations in the classroom. The results proved to be unambiguous. The experimental group showed considerably more learning-focused teacher activities than not-learning-focused ones. This group also showed considerably more learning-focused teacher activities than the control group. The designed learning environment proved to be effective in bringing about a change towards learning-focused teaching.

Getting Deeper - Research studies and active learning for student teachersí competences

Quantitative methods,Pre-service teacher education,Student learning,Competencies,Higher education

Hannele Niemi, University of Helsinki, Finland; Anne Nevgi, University of Helsinki, Finland;

The purpose of the presentation is to describe how student teachers benefit from authentic researcher experiences as part of their pre-service education. The data were collected by electronic questionnaires (n = 287) at two Finnish Universities. Teacher education programs guided the student teachers to use and conduct research in the teaching profession. The results indicate that the student teachers value research experiences. Research studies promoted professional competences and supported students' growth toward evidence-based practice and 21st century skills. Active learning experiences reinforced this positive effect. The implementation of research studies, quality of supervisors and integration with other studies were crucial.

Approaches to learning: Can they be enhanced by means of student-centred learning environments?

Comparative studies,Pre-service teacher education,Student learning,Learning approaches,Higher education

Marlies Baeten, KU Leuven, Belgium; Katrien Struyven, Vrije Universiteit Brussel (VUB), Belgium; Filip Dochy, KU Leuven, Belgium;

This paper investigates dynamics in approaches to learning within different learning environments. Two quasi-experimental studies were conducted with first-year student teachers (NStudy 1=496, NStudy 2=1098) studying a child development course. Data collection was carried out using a pre-test/post-test design by means of the Approaches to Learning and Studying Inventory. Study 1 compared a lecture-based learning environment with a student-centred learning environment. Results were opposite to the premise that student-centred instruction deepened student learning. Instead, the latter pushed students towards a surface approach. Study 2 investigated whether mixed learning environments consisting of lectures and student-centred teaching methods could enhance studentsí approaches to learning, compared to learning environments in which either lectures or student-centred teaching methods were used. Results showed that the deep approach, organised studying and effort management decreased in the lecture-based, the student-centred and the alternated learning environment, in which lectures and student-centred teaching methods were used by turns, while they remained the same in the gradually implemented student-centred learning environment. With respect to the surface approach, the strongest decrease was found in the latter learning environment. In conclusion, this paper shows the added value of gradually implementing a student-centred learning environment. Nevertheless, this paper confirms the difficulty of enhancing studentsí deep approach to learning.

25 August 2015 11:00 - 12:30

Room Green_A2

Symposium

Writing

Improving writing skills in primary education

Keywords: Language (L1/Standard Language),Metacognition,Primary education,Self-efficacy,Teaching/instruction,Writing/Literacy

Sig's: SIG 12 - Writing

Chairperson: Elke Van Steendam, KU Leuven, Belgium

Organiser: Renske Bouwer, Utrecht University, Netherlands

Organiser: Monica Koster, Utrecht University, Netherlands

Discussant: Gert Rijlaarsdam, University of Amsterdam, Netherlands

It is essential that children develop their writing competence at a young age, as writing skills play a crucial role in educational and occupational success. Despite its importance, a majority of elementary students does not attain the desired level of writing proficiency. Especially novice writers experience writing difficulties due to cognitive constraints while composing. Therefore, high-quality writing instruction is a necessity. Effective writing instruction, however, is not only a matter of teaching the right strategy, but it is a complex interplay between student and teacher characteristics. The aim of this symposium is to provide more insight on student and class-level correlates of students' writing performance. Concerning student characteristics, both cognitive (i.e. metacognitive knowledge, writing processes) and motivational aspects (self-efficacy, motivation) correlate to the quality of student's writing. Concerning class-level characteristics, teachers' attitudes, teacher efficacy, teachers' beliefs on writing education, and instructional writing practices may also impact students' writing quality. This suggests that interventions aimed at improving students' writing performance should be directed at both student and teacher level for optimal effectiveness. All contributions in this symposium focus on at least one of these student or class-level features, in order to analyze the current situation in elementary writing education in different national contexts (Flanders, The Netherlands and Switzerland). Furthermore, the implications for educational practice are discussed: how can instructional components be implemented to address cognitive as well as motivational aspects on both student and teacher level, and how may this enhance students' writing performance?

Students' writing related metacognitive knowledge under consideration of different genres

Metacognition,Self-efficacy,Language (L1/Standard Language),Writing/Literacy,Primary education

Tim Sommer, University of Basel, Switzerland;

Cognitive models of skilled writing (Hayes, 1996) claim, knowledge is an important ingredient in writing processes, and others state that it is crucial in the development of young writers (Scarmalaia & Bereiter, 1986). So successful writing is vastly determined by studentsí understanding of the writing process and the differences between a variety of genres (Harris et al., 2009) or in other words by their writing related metacognitive knowledge. This study focuses on the genre-specific differences in studentsí metacognitive knowledge. The aim is to find out what they know about the processes underlying writing and about the characteristics of different text genres. Furthermore it is examined how well elementary students perform in different writing tasks and whether or not studentsí performances are somehow linked to their metacognitive knowledge of different genres. Results suggest that there is a connection between studentsë writing related metacognitive knowledge and their writing performance. The more students know about their own writing process the better they perform. Findings also indicate that studentsë writing related metacognitive knowledge does differ in various genres. So we may assume that writing strategy instructions should focus more on studentsí awareness of their own writing process and that a emphasis on different genres could be worthwhile.

Student and class-level correlates of Flemish late elementary school childrenís writing performance

Teaching/instruction,Attitudes and beliefs,Self-efficacy,Language (L1/Standard Language),Writing/Literacy,Primary education

Fien De Smedt, Ghent University, Belgium; Hilde Van Keer, Ghent University, Belgium;

Due to the complexity of the writing process, students frequently experience writing difficulties. Consequently, high-quality writing instruction is a prerequisite to develop essential writing skills. To obtain this optimal instruction, this study first provides more insight into the practice of writing instruction in Flemish elementary education and into studentsí actual writing skills. Second, this study relates student and class-level characteristics to studentsí writing performance. In total 128 teachers and 1577 fifth and sixth grade students from 82 classes from 44 Flemish schools completed respectively a teacher and student questionnaire. Half of the students also completed a writing test in which they had to write an informative and a narrative text. Results reveal that teachers have a positive attitude towards writing (instruction), report a rather high teacher efficacy, and primarily focus on the explicit instruction of skills and processes during writing lessons. The present study also confirms the still underdeveloped writing skills of elementary school children. Furthermore, multilevel analyses indicate that students with a high self-efficacy for ideation and autonomous motivation write qualitatively better narrative and informative texts, while controlled motivated students are significantly less successful in writing narrative texts. Finally, teacher-efficacy for writing positively influences informative text quality. Consequently, this study points at the importance of supporting motivational components in order to provide optimal writing instruction in two ways: (1) fostering studentsí

self-efficacy for ideation and autonomous writing motivation and (2) stimulating teachersí personal teacher-efficacy for writing in which they attribute studentsí successful writing performance to their own writing instruction.

Writing education in the Netherlands: Teachersí beliefs, classroom practice and student achievements

Mixed-method research,Teaching/instruction,Attitudes and beliefs,Language (L1/Standard Language),Writing/Literacy,Primary education

Saskia Rietdijk, University of Amsterdam, Netherlands; Tanja Janssen, Universiteit van Amsterdam, Netherlands; Gert Rijlaarsdam, University of Amsterdam, Netherlands; Peter de Jong, University of Amsterdam, Netherlands;

According to the national inspectorate the quality of writing education in Dutch primary schools is poor. Moreover, according to national assessment reports the writing level at the end of primary education leaves a lot to be desired. This is unfortunate, because there is a vast body of research on effective approaches to writing instruction. Strategy instruction, in particular, was found to be highly effective in meta-analyses of intervention studies. Our main goal was to get insight into teachersí beliefs, classroom practices, student achievements and the relations between these variables. In addition, we wanted to find out what hindrances could be expected when strategy oriented writing instruction would be implemented. Data were collected of 51 teachers and 1135 students in grades 4 to 6, using a mixed-methods approach. Teachersí beliefs and self-reported classroom practices were measured by a questionnaire and an interview. In addition classroom observations were carried out to gain insight into instructional qualities of teachers and student engagement. Studentsí writing was measured in three writing tasks. The results show that teachers find explicit instruction important. Only a minority provides strategy oriented writing instruction, however: 32% of the teachers teaches writing strategies and 40% uses modeling of writing processes or strategies. Although the teachers do not consider correct writing to be important, they often mention aspects of correctness when asked to evaluate student texts. From lesson observations we learned that students are usually engaged during writing lessons. We conclude that the conditions for a strategy-oriented writing intervention are opportune.

Improving writing skills of students in upper elementary grades: An experimental intervention study

Design based research,Teaching/instruction,Language (L1/Standard Language),Writing/Literacy,Primary education

Monica Koster, Utrecht University, Netherlands; Renske Bouwer, Utrecht University, Netherlands; Huub van den Bergh, Utrecht University, Netherlands;

It has been established that, in the Netherlands, a majority of students does not attain the desired level of writing skills at the end of elementary school, and that the way writing is taught must be improved. To identify effective interventions to improve studentsí writing performance, we

conducted a meta-analysis of 32 (quasi-)experimental writing intervention studies, specifically targeted at students grade 4 to 6. Our analysis identified five instructional practices that significantly improved studentsí writing performance: goal setting, strategy instruction, text structure instruction, peer interaction, and feedback. Based on the results of this meta-analysis, we developed a program for the teaching of writing in grade 4 to 6, of which we tested the effectivity in a large-scale intervention study, involving 1186 students, using a cross lagged panel design with two conditions. Multilevel analyses revealed that in both conditions the quality of studentsí writing improved significantly after the program. Averaged over the two conditions, the writing proficiency of students improved by almost half a grade. Moreover, we found that two months after the intervention, the increased level of studentsí writing scores was retained for students in the first condition. These findings indicate that evidence-based practices combined into one program for teaching writing are effective in improving the writing performance of upper elementary students.

A 10

25 August 2015 11:00 - 12:30

Room Purple_H2

Symposium

Mathematics education

Strategy adaptivity in primary school arithmetic: student and instructional factors

Keywords: Cognitive development,Mathematics,Primary education

Sig's: SIG 17 - Qualitative and Quantitative Approaches to Learning and Instruction

Chairperson: Marian Hickendorff, Leiden University, Netherlands

Organiser: Marian Hickendorff, Leiden University, Netherlands

Organiser: Joke Torbeyns, KU Leuven, Belgium

Discussant: Aiso Heinze, Leibniz Institute for Science and Mathematics Education (IPN), Germany

Children and adults know and use a variety of strategies to solve arithmetic problems. The adaptivity of children's strategy use is an important aspect of mathematics education reform, striving for adaptive expertise. Research shows that several student and instructional factors affect individual differences in adaptive strategy use. The current symposium extends this literature with four empirical contributions addressing foundations of and student and instructional factors related to strategy use and adaptivity in primary school mathematics (grades

3 to 6), involving data from three different countries (Finland, Belgium, and the Netherlands). The two first contributions focus on important student characteristics as foundations of adaptive strategy selection, including students' number sense and numerical magnitude processing. The third and fourth contribution add to our insights into the influence of instruction on students' strategy adaptivity by integrating teacher and curricular factors, in addition to student characteristics like general math level and gender. Not only do the four contributions have a broad but focused theoretical foundation, they also include various and rigorous methodological designs and techniques, ranging from choice/no-choice designs to cross-cultural comparisons and advanced analysis techniques. The theoretical and educational significance of the contributions is discussed by prof. Heinze, an expert in the field of adaptivity in primary school arithmetic.

Operation production fluency: Exploring the foundations of adaptivity with whole-number arithmetic

Quantitative methods,Teaching/instruction,Cognitive development,Numeracy,Mathematics,Primary education

Jake McMullen, University of Turku, Finland; Boglarka Brezovszky, University of Turku, Finland; Erno Lehtinen, University of Turku, Finland;

Adaptivity and flexibility with arithmetic problem solving strategies are key aspects in the long-term development of mathematical skills, and the knowledge of numerical characteristics and relations are fundamental for adaptivity and flexibility with arithmetic. The present study represents the first attempt to specifically investigate knowledge of numerical characteristics and relations as a fundamental feature of adaptivity with arithmetic strategies, in particular investigating individual differences in operation production fluency among primary school students. 3rd to 5th grade participants (N = 55) completed a measure of their operation production fluency, which required participants to produce arithmetic sentences equaling a target number by using any combination of four to five given numbers and arithmetic operations. These studies revealed substantial individual differences in the quantity and quality of participantsí responses, indicating differences in the knowledge and use of numerical characteristics and relations. These results suggest that operation production fluency, and the knowledge of numerical characteristics and relations, may be important for investigations of adaptivity and flexibility with arithmetic.

Association between numerical magnitude processing and mental vs algorithmic multi-digit subtraction

Quantitative methods,Teaching/instruction,Cognitive skills,Numeracy,Mathematics,Primary education

Sarah Linsen, KU Leuven, Belgium; Lieven Verschaffel, KU Leuven, Belgium; Bert Reynvoet, KU Leuven, Belgium; Bert De Smedt, University of Leuven, Belgium;

When solving multi-digit subtraction problems, children are instructed to use different types of calculation methods adaptively, such as mental and algorithmic computation. By algorithmic computation we refer to performing arithmetic operations on digits (e.g. solving 78 ñ 23 = ? as 8 ñ 3 = 5; 7 ñ 2 = 5), whereas mental computation operates on numbers (e.g. solving 78 ñ 23 = ? as 78 ñ 20 = 58, 58 ñ 3 = 55). It has been contended that these two methods differentially rely on numerical magnitude processing, an assumption that has not yet been tested empirically. We therefore aimed to examine the association between numerical magnitude processing and performance with mental and algorithmic computation. We conducted a study in fourth grade children with a symbolic and a nonsymbolic numerical magnitude comparison task and two arithmetic tasks: one in which children had to use mental computation and one in which they had to apply algorithmic computation. Childrenís knowledge of elementary arithmetic facts was included as a potential alternative explanation for the expected association. Our results showed that both calculation methods rely on numerical magnitude processing. However, the association was more prominent for mental computation than for algorithmic computation. Since in mental calculation one flexible adapts the solution strategy to the problemís numerical features, numerical magnitude processing may thus be one of the foundations of strategy adaptivity. Follow-up regression analyses indicated that both symbolic numerical magnitude processing and childrenís elementary arithmetic facts knowledge had a unique role in explaining both mental and algorithmic computation.

Solution strategies and adaptivity in multidigit division in a choice/no-choice experiment

Quantitative methods,Teaching/instruction,Cognitive skills,Mathematics,Primary education

Marije Fagginger Auer, Leiden University, Netherlands; Marian Hickendorff, Leiden University, Netherlands; Cornelis M. van Putten, Leiden University , Netherlands;

Adaptive expertise in choosing when to apply which solution strategy is a central element of current day mathematics. A lack of such adaptivity in choosing between written and mental strategies (i.e., with and without writing calculations down) has been suggested to play a role in declining multidigit division performance in Dutch national assessments. These solution strategies were investigated experimentally with 162 sixth graders from 25 schools using the choice/no-choice paradigm. Children chose freely when to apply which strategy in the choice condition, but not in the no-choice conditions for mental and written calculation. As such, these no-choice conditions allowed for an assessment of strategy performance unbiased by selection effects (strategy selection differing by student ability and item characteristics). Mental strategies were found to be less accurate but faster than written ones, and problems with adaptivity in choosing between the two were indicated for lower ability students. No effects of the teacher on studentsí choices between mental and written strategies were found. Implications for the feasibility of adaptive expertise for lower ability students are discussed.

Dutch and Flemish childrenís use of (non)standardized strategies on multi-digit arithmetic

Quantitative methods,Teaching/instruction,Cognitive development,Mathematics,Primary education

Marian Hickendorff, Leiden University, Netherlands; Joke Torbeyns, KU Leuven, Belgium; Lieven Verschaffel, KU Leuven, Belgium;

During the last decades, the value and the place of standard written algorithmic versus mental computation strategies (non-standardized number-based strategies carried out with ñ not just in ñ the head) for solving elementary mathematics problems has been seriously debated. We aimed at analyzing the strategy competencies in the domain of multi-digit subtraction and division of children from countries differing in teaching practices related to the use of standard algorithms versus mental computation strategies: the Netherlands and Flanders (Belgium). In total, 155 Dutch and 160 Flemish 3rd to 6th graders were offered two types of multi-digit subtractions and divisions, where half of the problems had number characteristics expected to elicit the use of mental computation strategies. Results revealed that, contrary to our expectations, Dutch children more frequently relied on standard algorithms than their Flemish peers after these standard algorithms were introduced. Furthermore, regarding the adaptive selection of mental computation strategies based on the problemís number characteristics, Flemish children were as adaptive as their Dutch peers in division, and even more adaptive in subtraction. It thus seems that the instructional differences between these two countries did not affect childrenís strategy behavior in a straightforward manner.

A 11

25 August 2015 11:00 - 12:30

Room Yellow_G5

Symposium

Researcher education

Problematizing research degrees

Keywords: Doctoral education,Higher education,Knowledge creation,Researcher education

Sig's: SIG 24 - Researcher Education and Careers

Chairperson: Margaret Kiley, Australian National University, Australia

Organiser: Margaret Kiley, Australian National University, Australia

Discussant: Montserrat Castello , Universitat Ramon Llull, Spain

Current research suggests that the purposes, outcomes and experiences of doctoral education have changed substantially over the past few decades and this multi-national symposium aims to extend this research by looking at some of the implications of these developments. To set the scene the paper by Kiley outlines findings a survey of doctoral candidates in Australia regarding their experiences of skill development during candidature and preparation for employment. The

survey asked questions in the areas of: "Aspects of your doctoral program"; "Plans for the future" and "About you and your enrolment". The second presentation by Bengtsen cogently outlines the informal curriculum associated with doctoral candidate learning and the critical role of peers. Based on research in Canada, Finland, and Denmark this study examines the many ëextra-curricular' activities that help many candidates move forward when they get stuck. A different way of problematizing the doctorate is presented in the third paper by Keefer where he examines what constitutes researcher education and how those who pursue it often do so regardless of realistic future work opportunities in their areas. The symposium concludes with Wisker's paper where she problematizes the doctorate through the professional learning of candidates by examining the benefits and challenges of undertaking a PhD as part of professional practice. Each of these papers provides us with new and creative ways of considering doctoral education for the 21st century form different methodological, theoretical and national perspectives.

Is there more to a PhD than just the thesis?

Quantitative methods,Researcher education,Achievement,Interdisciplinary,Doctoral education,Knowledge creation

Margaret Kiley, Australian National University, Australia;

The aim of this research was to identify the experiences of Australian PhD candidates with regard to skills development and the areas in which they felt they needed additional help to be employment-ready. This research is critical in light of the reduction in the number of academic positions as well as a greater structuring of the doctoral curriculum. An online survey was developed with 724 useable responses with an almost 50:50 representation of respondents by broad area of study i.e. Science, Technology, Engineering and Mathematics (STEM) and Humanities, Arts and Social Sciences (HASS). When asked about the opportunities they had been given to develop particular skills during candidature the most common were: independent research skills; knowledge about designing and undertaking research; critical thinking, and skills/knowledge in using appropriate research tools. On the other hand the areas in which they reported minimal opportunities to develop knowledge and skills were: financial skills related to research; grant writing; leadership skills; project management; and working as part of a team. Over 60% of all the respondents reported that they needed additional support and training in to be competitive for employment. The paper, as part of the overall symposium, will set the scene for the other three papers to report findings on specific situations arising from the changes that have been identified, in particular the reduction in the number of permanent academic positions as well as a greater structuring of the doctoral curriculum.

Sprawling spaces: Darkness, idiosyncrasy and secrecy as drivers in doctoral education

Mixed-method research,Researcher education,Social aspects of learning,Interdisciplinary,Doctoral education,Learning in context

Soren Bengtsen, Aarhus University, Denmark;

The research into the formal (institutional) and informal (enculturation) dimensions of doctoral education is today extensive and widespread. However, the ënon-formalí dimension of doctoral education has been unjustly overlooked. Non-formal learning is here defined as the private spaces, non-disciplinary, and non-academically learning spaces of the doctoral students, which are traditionally seen as irrelevant and superfluous when researching and reflecting doctoral pedagogy. Contemporary research into the diversity of doctoral studentsí learning strategies foreground support and coping systems that are activated outside institutionalized supervision and mentoring. Students draw on many sources for support and feedback other than their supervisors and mentors, which suggests that doctoral supervisors and supervision may not be as central to completion and development of ëthe independent researcherí during the PhD as hitherto assumed. Also, students engage in learning activities with other research groups and take courses not directly linked to their research project without telling their supervisors. Students experience that such ëextra-curricularí activities help them move forward when they get stuck and act as catalyzers for the growth of ideas that often become key to the development of their thesis. My presentation builds on empirical studies of such non-formal learning spaces from mainly Canada, Finland, and Denmark, and I draw on the concepts of ëdarknessí, ëidiosyncrasyí, and ësecrecyí from the literature on doctoral education and educational philosophy in presenting an outline for a doctoral pedagogy that acknowledges non-formal aspects as resources and central drivers in doctoral education.

Preparing for an uncertain future in Higher Education: Theoretical Implications for Researcher

Qualitative methods,Researcher education,Social aspects of learning,Interdisciplinary,Doctoral education,Knowledge creation

Jeffrey Keefer, New York University / VNSNY, United States;

With numerous reasons to pursue doctoral education, methods to accomplish it, and kinds of doctorates to be had, research and practice doctoral degrees are increasingly blurred across institutions and their learners. With global inconsistencies increasing, it appears almost fashionable to try to reconceive what doing a doctorate means (Boud & Tennant, 2006; Chiteng Kot & Hendel, 2012; McAlpine & Norton, 2006). However, many of these studies seek to explore this area from the perspective of the higher education economy, industry, national standards, and disciplinary expectationsósometimes leaving the experiences, needs, and intentions of recent postgraduates to their own devices. This research theorizes the shifting nature of adjunct instructors with research degreesóthose alternately known as part-time, contingent, temporary, casual, or non-permanent teachers in higher educationówho cannot attain full-time research positions, and proposes a framework to reconceive their roles. This work problematizes what constitutes researcher education and how those who pursue it often do so regardless of realistic future work opportunities in their areas. The notion of Flexible Academics is developed as an identity to allow the role to be talked about as distinctive from an early career researcher, something different not only by the growing period it may last, but also because of its increasingly permanent possibility.

Making a difference: academics and their PhDs in professional practice

Qualitative methods,Researcher education,Conceptual change,Interdisciplinary,Doctoral education,Lifelong learning

Gina Wisker, University of Brighton, United Kingdom;

In response to increased global focus on gaining doctorates for academic staff (Jorgensen, 2012) and recognition of the learning, practice and identity challenges they face (Henkel, 2005; Clegg, 2008) this research investigates PhD experiences of mid-career academic staff in professional practice-based disciplines in the UK and internationally. It first explores the benefits and challenges of undertaking a PhD in terms of their professional development, secondly the theorising and enhancement of their practice and thirdly their professional practice based teaching, considering the influence of their research base on that teaching. Fourthly it looks at if and how their PhD experience has changed their professional practice, the ways in which they think and work in the workplace, and finally its effect on their academic identities. The research is in two parts: (1) rescrutinising two linked earlier projects, doctoral learning journeys (2007-10) and the parallel international project (2007-14); and (2) new small scale qualitative face-to -face or email interviews with six UK and international academics. The focus is on academics from across Education, Health and Business. Drawing on Bitzerís (2011) conceptual framework for exploring doctoral success, Anne Leeís supervisor/student interaction framework (2011), academic identities theory (Henkel, 2005; Clegg, 2008), theories of academic related professional practice (Eraut 2007) and theories of conceptual threshold crossing in the doctoral learning journey (Wisker & Robinson; 2009; Wisker & Kiley, 2010) It offers useful insights into experiences of academics undertaking PhDs in terms of the effects on knowledge construction, teaching, identity, and contribution to professional practice.

A 12

25 August 2015 11:00 - 12:30

Room Brown_B5

Symposium

Learning in context

Weaving the†mediational†texture of transformative agency: The potential of double stimulation

Keywords: Cultural psychology,Design based research,Developmental processes,Learning in context,Social aspects of learning

Sig's: SIG 10 - Social Interaction in Learning and Instruction

Chairperson: Annalisa Sannino, University of Helsinki, Finland

Organiser: Annalisa Sannino, University of Helsinki, Finland

Discussant: Asa Makitalo, University of Gothenburg, Sweden

Literature on agency includes relatively few studies specifically focused on transformative agency, that is, the human beings' foundational capability to transform the circumstances in the world they inhabit. Understanding how transformative agency comes into being, how it evolves and how it can be nurtured are crucial educational challenges in today's world of increasing uncertainties. Recent developments in activity theory point at Vygotsky's principle of double stimulation as a key conceptual and practical resource for studying and facilitating the emergence of this type of agency. According to this principle, learners' transformative agency emerges by overcoming conflicts of motives with the help of auxiliary mediating means, or second stimuli. Each one of the contributions to the symposium examines a specific aspect of the framework of double stimulation. Sannino reconstructs a double stimulation process in which discursive steps and material actions turned a conflict of motives into an innovative and unexpected pedagogical outcome. Bronkhorst, Koster, Meijer, and Vermunt focus on student teachers' resistance as a starting point of double stimulation leading to transformative agency. Lund, Vest?l, and Rasmussen examine double stimulation as a design principle serving the transformation of exams in teacher education. Engestr?m illustrates how in situations of conflict of motives restrictive and expansive uses of artifacts in a work activity can respectively prevent or trigger double stimulation. As a whole the contributions to this symposium demonstrate empirically how specific emerging forms of transformative agency can be identified, supported and enhanced by double stimulation in settings of education and workplace learning.

From conflicts of motives to transformative agency: The key role of double stimulation

Design based research,Cultural psychology,Developmental processes,Learning in context

Annalisa Sannino, University of Helsinki, Finland;

While double stimulation is widely acknowledged as a foundational concept in studies of learning and instruction, as well as in formative interventions inspired by the work of Vygotsky, its connection to agency has seldom been the object of systematic analysis. The study presented here aims at scrutinizing specifically this connection. With the help of an empirical example from a ìFifth Dimensionî formative intervention in a rural elementary school, the emergence of transformative agency is scrutinized as a double stimulation process characterized by struggles with conflicting motives and by the uptake of mediational means or second stimuli to overcome the conflicts of motives. The analysis points at the central role double stimulation can play in explaining how and why transformative agency emerges or fails to emerge. The analysis indicates that educational effors aimed at fostering transformative agency should start by exploring potential conflicts of motives experienced by the learners and the mediational resources which can possibly be mobilized to deal with such conflicts.

Student teachersí resistance: Discursive manifestations and support for transformative agency

Design based research,Cultural psychology,Developmental processes,Learning in context

Larike Bronkhorst, Utrecht University, Netherlands; Bob Koster, Interactum, Hogeschool Domstad Utrecht, Netherlands; Paulien C. Meijer, Utrecht University, Netherlands; Jan Vermunt, University of Cambridge, United Kingdom;

In this study we analyze manifestation and development of resistance and resulting transformative agency, triggered by double stimulation and supported by redefined material artefacts and an educatorís discursive reasoning, in an educational setting. We engaged in a cross-case analysis of a purposeful sample, exploring how emerging forms of transformative agency can be discursively identified, supported and enhanced in educational settings. Based on our open content analysis of two student teachers in a year-long teacher education program, we conclude that different discursive manifestations of conflicting motives in studentsí text and interactions exist, one of which (i.e. disidentification) might not be easily recognized. Moreover, our results indicate that educatorsí support of transformative agency can be taken up by students in different ways. A restrictive use of the material artefact coincided with the learning mechanism ìcoordinationî, whereas expansive use of the artefact concurred with ìtransformationî. Although both can be conceptualized as learning, only in the case of transformation did the student recognize her own agency. We discuss how the educational setting affirms strict guidelines as to what is expected of student teachers, encapsulated in material artefacts, which may restrict studentsí transformative agency and perhaps lead to conflict(s) in supporting studentsí transformative agency.

Double stimulation as a design principle: Transforming exams in teacher education

Design based research,Cultural psychology,Developmental processes,Learning in context

Andreas Lund, University of Oslo, Norway; Jon Magne Vestol, University of Oslo, Norway; Ingvill Rasmussen, University of Oslo, Norway;

The present paper analyses how academic staff constructed and how student teachers responded to and appropriated a new type of exam that required integration of various knowledge domains as well as made available a series of resources. We link the Vygotskian notion of double stimulation to transformative agency and design. On the systemic level the teacher educators developed a design for teaching consisting of an exam task as first stimulus and a range of resources as second stimuli. On the level of enacted design students transform the teaching design into a design for learning, accessible through student interviews and exam papers. The video case acts as an exam resource that is expanded by the students through a variety of interpretations that are mediated through other resources producing distinct patterns of knowledge construction. We argue that a conceptual approach involving transformative agency, double stimulation, and design makes visible connections important for identifying and bringing about educational change.

Restrictive and expansive uses of artifacts: Double stimulation in everyday work

Design based research,Cultural psychology,Developmental processes,Learning in context

Yrjo Engestrom, University of Helsinki, Finland;

What are the key characteristics and learning potentials of double stimulation in an everyday work activity undergoing major changes? Double stimulation is accomplished by making use of an artifact as a second stimulus in a conflict situation. When we look for occurrences of double stimulation in everyday work, the uses of artifacts are therefore the main clue to follow. Accordingly, the analysis is focused on different uses of artifacts and the consequences of these uses in critical encounters at work. The data consist of 26 videotaped home care visits understood as critical encounters. The home care workers and the elderly clients faced the conflictual challenge of implementing a new instrument called the Mobility Agreement, aimed at integrating regular mobility exercises in the daily routines of the client. The findings support the assumption that critical encounters between professionals and clients are fruitful breeding grounds for double stimulation in work activities. Two dimensions were identified in the uses of artifacts, namely the dimension of restrictive vs. expansive use of artifacts and the dimension of incidental vs. planned use of artifacts. The planned and professionally initiated use of novel artifacts is likely to succeed best when it connects and merges with client-initiated and incidental uses of artifacts as second stimuli.

A 13

25 August 2015 11:00 - 12:30

Room Blue2_D2

Symposium

Social interaction in L&I

Help seeking in educational contexts: Novel contributions and new directions

Keywords: Computer-assisted learning,Metacognition,Self-regulation,Social interaction,Special education,Teacher professional development

Sig's: SIG 10 - Social Interaction in Learning and Instruction

Chairperson: Julie Mulet, Universite Toulouse Jean-Jaures, France

Organiser: Julie Mulet, Universite Toulouse Jean-Jaures, France

Organiser: Sabine Zorn, INS HEA, France

Discussant: Eleftheria Gonida, Aristotle University of Thessaloniki, Greece

Seeking help that can promote learning is now recognized as an important self-regulation strategy (e.g., Karabenick & Newman, 2009). This symposium will bring together four programs of research conducted in different countries, from different theoretical perspectives, designed to further understanding as to who is more likely to engage in adaptive help-seeking (HS), in which contexts and circumstances. Because learning situations include various actors and kinds of

interaction, presentations address behaviors among students in both classroom (Butler; Puustinen et al.) and interactive learning environments (Mulet et al.). In keeping with the conference theme of reinforcing synergies between learning, teaching, and research, the symposium extends the traditional focus on students in regular classrooms to consider students with special needs (Puustinen et al) and teachers as help seekers (Makara & Karabenick) and helpers (Butler, Puustinen et al). The studies used diverse methods to examine the influence of personal factors, including students' visual impairment (Puustinen, et al), self-efficacy (Mulet, et al), gender and achievement goals, and (Butler), and teachers' experience and beliefs about HS (Makara & Karabenick) on both adaptive HS and less desirable alternatives such as cheating. Presentations will also extend research on contextual influences on HS by showing how personal factors influence perceptions of the learning context (Butler) and responses to an intervention (Mulet, et al). The papers make novel contributions to understanding the determinants and dynamics of HS, and suggest new directions for promoting constructive self-regulation in educational contexts. Our discussant will elaborate implications for theory, future studies, and educational practice.

Help-seeking assistance and use of help: The role of self-efficacy and help perceptions

Quantitative methods,Metacognition,Self-efficacy,Self-regulation,Computer-assisted learning

Julie Mulet, Universite Toulouse Jean-Jaures, France; Caroline Dupeyrat, Universite Toulouse 2, France; Jean-Christophe Sakdavong, Toulouse Jean-Jaures University, France; Nathalie Huet, University of Toulouse, France;

The aim of this research is to study the role of studentsí self-efficacy, perception of help and the impact of computerized help-seeking assistance on help-seeking behavior (help-seeking avoidance and help abuse) while learning with an interactive learning environment (ILE). The study was conducted with 46 undergraduate students. In the help-seeking assistance condition (N=23), the system intervened after each unsuitable help-seeking action (help avoidance and/or help abuse) by providing a prompt message advising students to regulate their help-seeking demand. The control group (N=23) had no help-seeking assistance. Students in the assistance condition avoided less help than those who were in the control condition, but there was no significant difference for help abuse. In the assistance condition, students who perceived the benefits of help-seeking were less likely to avoid help-seeking, but they asked for help even when they didnít need it. However, when help-seeking was perceived as a threat to autonomy, students avoided help-seeking. Furthermore, students with low self-efficacy tended to ask for help even when they had the knowledge required to achieve the task by themselves. Surprisingly, these correlations were only found in the assistance condition, and not in the control group. No interactions were found between assistance condition and self-efficacy or perceptions of help. More research is needed to understand the mixed impact of help-seeking assistance. This study provides insight to develop our understanding of the relationships between self efficacy, help-seeking perceptions and actual help-seeking behavior in ILEs.

Personal and contextual influences on help-seeking and cheating: Gender differences and similarities

Goal orientation,Metacognition,Self-regulation,Social aspects of learning

Stuart Karabenick, University of Michigan, United States; Ruth Butler, Hebrew University of Jerusalem, Israel;

Researchers have examined the interplay of personal and contextual influences on students' adaptive help seeking (HS) and on the less desirable strategy of cheating, but few systematically consider gender. This presentation will integrate research on gender, motivation and academic self-regulation to propose that gender differences in achievement goals and perceptions of teachers lie behind and thus mediate gender differences in HS and cheating. I shall then present a study in which 1765 (52% girls) middle school students in Israel completed measures of their achievement goals, intentions to ask the teacher for needed academic help and cheating in a specific class, and of the degree to which the teacher in that class (a) supports student help seeking, , and (b) inhibits HS. As predicted, analyses (mean comparisons, SEM) confirmed gender differences in both predictors and outcomes and gender similarities in the paths to HS and cheating. Among both boys and girls, HS was predicted by higher levels of mastery goals and perceived support, and lower levels of avoidant goals and teacher inhibition, and cheating by higher levels of work avoidance and teacher inhibition and lower levels of mastery goals and teacher support. Moreover, perceptions of the teacher and achievement goals fully mediated gender differences in both student outcomes. Results contribute to understanding how gendered orientations to achievement and social interaction influence the academic motivation and self-regulation of boys and girls. I shall address implications for ways in which teachers may promote adaptive HS, especially among boys.

Help seeking in students with a visual impairment: Studentsí and teachersí perspective

Special education,Teaching/instruction,Self-regulation,Social interaction

Minna Puustinen, INS HEA, France; Arneton Melissa, INS HEA, France; Nathalie Lewi-Dumont, INS HEA, France; Mathieu Gaborit, Paul Doumer public elementary school, France;

The results of two studies concerning mathematics-related help-seeking behaviour in secondary school students with a visual impairment were compared. In the first one, we analyzed questionnaires completed by visually impaired students (n = 16), whereas in the second one the questionnaires were completed by secondary school mathematics teachers who teach mathematics to at least one visually impaired student (n = 42). The results revealed that studentsí and teachersí evaluations of the studentsí help-seeking level do not coincide. In particular, the visually impaired students considered that they ask for help sufficiently, whereas a majority of the teachers considered that visually impaired students should ask for more help than they currently do. In addition, the teachersí self-reported pedagogical behaviour did not differ as a function of the completion (vs. non-completion) of training on special educational needs. More research, in particularly observations in real learning situations of student-teacher dyads or joint interviews of students and teachers, are necessary in order to complete these self-reported data. In addition to describing the help-seekersí and help-giversí attitudes towards this self-regulated learning strategy, our research contributes to developing a new theoretical approach of help seeking. In fact, if we consider that social interaction between help-seekers and helpers is an essential part of help seeking, then it seems evident that the dynamics of the help-seeking process

change if the help-seekers have difficulties for example in establishing joint attention, as it has been shown to be the case for visually impaired children.

Teachersí help-seeking beliefs and help-seeking networks

Quantitative methods,Teacher professional development,Attitudes and beliefs,Secondary education

Kara Makara, University of Glasgow, United Kingdom; Stuart Karabenick, University of Michigan, United States;

Teachers work within a network of teachers at their school whose members can be an important source of advice and help, yet they must seek help from their colleagues in order to benefit from this network. This study employs social network analysis to examine how help-seeking patterns among teachers are related to teachersí curricular domain, years of experience, and gender. Additionally, we examined how help-seeking beliefs (instrumental, expedient, and perceived threat) are related to help-seeking networks. Teachers (n = 81) from a representative U.S. high school participated in an online survey. They completed measures of their beliefs of help seeking and listed whom they sought help from at school. The data was used to create a network map of help-seeking relations. Results demonstrated that there were no gender differences. More experienced teachers reported lower instrumental benefits of help seeking but were sought for help more often by their colleagues. There were also differences in help seeking based on teachersí subject area as indicated by the social network patterns. Associations between beliefs about help seeking and help-seeking network patterns were non-significant although in the hypothesized direction. This study lays the groundwork for further understanding of teachersí help-seeking beliefs and help-seeking networks, including relevant factors that influence teacher help seeking within schools.

A 14

25 August 2015 11:00 - 12:30

Room Orange_E1

Symposium

Higher education

Pre-service Teacher Education Towards the 21st Century

Keywords: Competencies,Educational technology,Pre-service teacher education,Teaching/instruction

Sig's: SIG 11 - Teaching and Teacher Education

Chairperson: Kati Makitalo-Siegl, University of Eastern Finland, Finland

Organiser: Kati Makitalo-Siegl, University of Eastern Finland, Finland

Organiser: Anniken Furberg, University of Oslo, Norway

Discussant: Frank Fischer, Ludwig-Maximilians-Universitat (LMU), Germany

The current symposium aims to provide knowledge on how the teacher educational system can better meet and prepare future teachers for the challenges posed by today's knowledge society. Successful work and life in the information society calls for 21st century skills, such as collaboration, problem solving, critical thinking, digital literacy, citizenship and creativity. Concerning the need for digital competency, a general finding reported by research reports from various countries is a mismatch between the digital challenges that newly qualified teachers meet in their profession and the preparations they have received during their teacher education. Our core argument is that digital competency implies more than being able to use digital tools; it also involves being able to use various digital tools for learning and teaching purposes. Successful learners use a repertoire of strategies to guide and enhance their learning process towards completing academic tasks. Today, regulating learning is rarely a solitary task, for example, study groups, team work and social networks require increased collaborative competence. These above-mentioned skills are also vital for today's teachers in terms of developing new teaching methods and assessment tools, as well as in order to prepare students for being participating and "educated citizens" in the 21st century. Against this backdrop, this symposium brings together four papers that enables a possibility to expand our knowledge on strategic and collaborative learning skills, widen our understanding about the development of teacher's digital competencies as well as providing knowledge about how teacher education systems can and should enhance pre-service teachers' professional digital competencies.

Enhancing teacher studentsí collaborative problem solving and strategic learning skills

Educational technology,Pre-service teacher education,Problem solving,Self-regulation,Computer-supported collaborative learning,Inquiry learning

Paivi Hakkinen, University of Jyvaskyla, Finland; Sanna Jarvela, University of Oulu, Finland; Arto K. Ahonen, University of jyvaskyla, Finland; Piia Naykki, University of Oulu, Finland; Johanna Poysa-Tarhonen, University of Jyvaskyla, Finland; Kati Makitalo-Siegl, University of Eastern Finland, Finland;

The aim of this study is to answer the challenges that teacher education faces in responding to the needs of 21st century learning environments, such as inquiry-based, collaborative learning approaches using ICT. We have answered these challenges by developing a theory-based pedagogical framework for promoting teacher studentsí 21st century learning skills as part of our research project ìPreparing teacher students for the 21st century learning practicesî (PREP21). This work is based on long-term research on self-regulated learning, strategic learning skills, and the process of collaborative learning. In the presentation, we will outline the theory-based designs for technology-rich, inquiry-based collaborative learning practices supported by instructing and prompting collaborative problem solving (CPS) and socially shared regulation (SSRL). We will elaborate the processes and strategies for collaborative problem solving skills

and strategic learning skills to specify current, rather general claims presented regarding the discussion on 21st century skills. In doing this, we will present examples of the findings of our ongoing empirical study including data on the first-year studentsí skills in these areas and process-oriented data on collaboration and regulation processes. This research will bring sustainable high-quality practices to teacher education and provide insight into the development of student teachersí 21st century skills and the methodology for investigating these skills.

Professional digital competence in teacher education: A conceptual framework and design model

Educational technology,Pre-service teacher education,Teacher professional development,Competencies

Anniken Furberg, University of Oslo, Norway; Andreas Lund, University of Oslo, Norway;

The focus of this position paper is on the conceptualization of professional digital competence (PDC) in the teaching profession and its consequences for teacher education. The aim is to establish a concept that captures challenges and possibilities related to teaching and learning in technology-rich settings. By using three school subjects as illustrative cases, we argue for the necessity of viewing PDC as comprising a deep understanding of technology, knowledge of studentsí learning processes, and an understanding of the specific disciplinary practices and features characterizing individual school subjects. Thus, PDC emerges at the juxtaposition of generic and specific competences. Consequences for teacher education are sought operationalized in the shape of a tentative model for designing complex learning environments and trajectories.

Pre-service teachersí understanding of and willingness to use ICT in education

Educational technology,Pre-service teacher education,Attitudes and beliefs,Competencies

Teemu Valtonen, University of Eastern Finland, Finland; Kati Makitalo-Siegl, University of Eastern Finland, Finland; Erkko Sointu, University of Eastern Finland, Finland;

This paper focuses on pre-service teachersí use of ICT in education from the perspectives of Technological pedagogical content knowledge (TPACK) and Theory of planned behavior (TPB). The aim is to outline future directions of measuring areas represented in these theoretical frameworks by emphasizing pedagogical aspects. In this context, pedagogical aspects refer to 21st century skills, i.e., skills that todayís students are expected to gain in schools. We outline several factors related to the use of ICT in education and claim that a valid pedagogical approach should be included in these theoretical frameworks. Pedagogical approaches, which will support the development of the 21st century skills will be defined. Then this paper outlines the development of instruments for measuring TPACK and TPB and ideas of using these instruments for conducting a longitudinal research focusing on the development of pre-service teachersí areas of TPACK and TPB and their relations with the examples from the data.

Preparing pre-service teachers for teaching with technology

Case studies,Mixed-method research,Educational technology,Pre-service teacher education,Secondary education

Wilfried Admiraal, Leiden University, Netherlands;

The quality of how technology is addressed in teacher education programs is conditional for how student teachers apply technology in secondary schools after their graduation. However, in teacher education programs, technology receives little attention, neither how it can be used in secondary education nor as support of pedagogy in teacher education itself. This is particularly the case for social media, such as Wikiís, blogs, collaborative work spaces, social networking, shared bookmarking and the like. This means that most learning how to teach with social media in secondary education is done during school practice, after student teachers have graduated and entered the profession. Yet schools expect from their new teachers that they bring in knowledge and skills. Hence, more attention to social media in teacher preparation programs make this learning process of preservice teachers more efficient and effective and refill schools with new knowledge and skills. Four technology-infused courses of two teacher education programs were evaluated. In line with studies on the development of pre-service teachersí technological, pedagogical and content knowledge, two important enablers were distinguished: 1) teaching practice to enact what was learned in teacher education institution as well as to receive feedback from students on this enactment and 2) modeling of teacher educator and teachers in school. Both enablers might ask for further development of knowledge and skills of both teacher educators and school teachers.

A 15

25 August 2015 11:00 - 12:30

Room Purple_H4

Symposium

Emotion and affect

Emotions in Higher Education

Keywords: Content analysis,Emotion and affect,Higher education,Mixed-method research

Sig's: SIG 4 - Higher Education

Chairperson: Julia Mendzheritskaya, Goethe-Universitat Frankfurt, Germany

Organiser: Miriam Hansen, Goethe-Universitat Frankfurt, Germany

Organiser: Julia Mendzheritskaya, Goethe-Universitat Frankfurt, Germany

Discussant: Sari Lindblom-Ylanne, University of Helsinki, Finland

Emotions in teaching have recently received increased attention not only in school context but also in higher education (Hagenauer & Volet, 2013; Postareff & Lindblom-Ylänne, 2011; Trigwell, 2012). This symposium aims to bundle recent work on emotions in higher education and will address both the perspective of students (Postareff, Hailikari & Lindblom-Yl?nne) as well as the perspective of higher education teachers (Kordts-Freudinger; Hagenauer, Gl?ser-Zikuda & Volet; Hansen, Mendzheritskaya & Scherer). Regarding the methodology, most contributions of this symposium report results of interview-studies using qualitative coding systems and conducting in-depth analyses of emotion perception and emotion display (Postareff et al., Hagenauer et al., Hansen et al.), some studies used mixed-methods approaches (Hansen et al.; Postareff et al.), or online-questionnaires (Kordts-Freudinger). Taken together, the symposium helps to shed light on the role of emotions and emotional display in studying at university, in student-teacher-relationships, and in good teaching at university. It increases the empirical evidences on the role of emotions in higher education and addresses practical concerns for pedagogy at universities.

Complex relationship between emotions, deep learning and study success during first study year

Mixed-method research,Student learning,Emotion and affect,Higher education,Motivation and emotion

Liisa Postareff, University of Helsinki, Finland; Telle Hailikari, University of Helsinki, Finland; Sari Lindblom-Ylanne, University of Helsinki, Finland;

This study adopts a mixed-method and person-oriented approach to explore how first year university studentsí emotions, deep approach to learning and study success (academic achievement and study progress) are related to each other at the individual level. The participants are 43 students who participated in an interview and filled in the Learn-questionnaire at the beginning of their second study year, reflecting back on their first year experiences. From the interviews, each studentís emotions and their intensity were analysed through qualitative content analysis. From the Learn-questionnaire the scale measuring studentsí deep approach to learning was analysed. GPA of all first year courses was used to measure academic achievement and the number of earned credits was used to measure studentsí study progress. A wide range of emotions, varying in terms of their frequency and intensity, were identified. Students showing similar patterns in terms of their emotions, deep approach and study success were grouped together. Among some students positive emotions were related to deep learning and good study success, and among others strong negative emotions were related to lower scores on deep learning and lower study success. However, these different components were not always as logically related to each other as previous research results have implied. The results can be used in designing effective learning environments for first year students which enhance deep learning and generate emotions that are beneficial for learning.

Emotional underpinnings of student orientation in higher education teachers

Quantitative methods,Teaching/instruction,Emotion and affect,Higher education,Motivation and emotion

Robert Kordts-Freudinger, University of Paderborn, Germany;

The study aims at discerning trait affective correlates of academicsí student-oriented teaching approach. Based on previous research on university teachersí emotions and their student orientation (e.g., Trigwell, 2009), on effects of emotion regulation strategies (e.g., Gross & John, 2003) and on perspective-taking abilities (e.g., Swartz & McElwain, 2012), the study assessed affective trait variables that were hypothesized to relate to a student-focused teaching approach: the frequency of experiencing specific positive and negative emotions, the emotion reappraisal regulation strategy and affective components of perspective-taking (i.e, empathic concern). N = 130 academics at German universities filled in several questionnaires: a new Emotions in Teaching Questionnaire including discrete positive and negative emotions during teaching; the Emotional Regulation Questionnaire (Gross & John, 2003), the Approach to Teaching Inventory (Trigwell & Prosser, 2004) and the Interpersonal Reactivity Index (Davis, 1983). Student orientation was related to all of these affective variables. The analysis found independent links to both positive emotions and emotional reappraisal (? = .44 and ? = .24, respectively). In addition, both empathic concern and personal distress were independently related to student orientation (? = .22 and ? = -.24). As shown, academicsí student orientation is based on affective trait variables. Both the experience of positive emotions, especially in relation to other people (empathic concern and personal distress) and the regulation of emotions, explain much variance of student orientation. The study calls for more attention to affective variables in the theory on teaching behavior and in the practice of academic development.

Teacher emotions in higher education ñ a comparison between Australia and Germany

Content analysis,Teaching/instruction,Emotion and affect,Higher education,Motivation and emotion

Gerda Hagenauer, University of Bern, Switzerland; Michaela Glaeser-Zikuda, University of Erlangen-Nuremberg, Germany; Simone Volet, Murdoch University, Australia;

This presentation aims at exploring university teachersí emotions generated through teaching and interacting with students and the emotion display from a cross-cultural perspective, as emotions are influenced by culture. Generally, emotions in higher education gain increase attention as they impact quality teaching and learning, as well as well-being of teachers. The present study reports on findings of an interview-study conducted with Australian and German university teachers in teacher education. Emotions, antecedents of emotions and emotion display were expected to differ to some degree between the two countries due to differences in cultural values, norms, expectations, and academic habitus. In-depth interviews with 15 Australian and 10 German teachers generated rich accounts and reflections on teachersí emotional experiences and emotion expression during teaching. The results revealed that German and Australian university teachers viewed the open expression of positive emotions as an integral part of teaching while negative emotions had to be controlled based on their understanding of professionalism in the job. However, some subtle yet noticeable differences in the mode of emotion display also emerged between Australian and German university teachers, especially in terms of anger display but also in relation to the display of positive emotions. The findings will be discussed in light of previous

research, with a particular focus on the impact of culture and social relations on emotions. Limitations of the study will be addressed, and directions for future research proposed.

University teachersí emotional display in different teaching related situations

Content analysis,Mixed-method research,Teaching/instruction,Emotion and affect,Higher education,Motivation and emotion

Miriam Hansen, Goethe-Universitat Frankfurt, Germany; Julia Mendzheritskaya, Goethe-Universitat Frankfurt, Germany; Sonja Scherer, Institute of Psychology, Germany;

To scrutinize university teachersí emotional display in different situations, we conducted 22 semi-structured interviews with German university teachers from different disciplines. Out of these interviews we extracted 54 situations triggering emotions in higher education that were coded with regard to the type of situation, emotion, and display mode. A relation of these dimensions revealed that the display mode differed significantly between negative and positive emotions, with positive emotions being always expressed as felt in contrast to a wider range of display modes for negative emotions. Further, experienced emotions were reported more frequently to be expressed in any way during lectures compared to office hours. A deeper analysis of the situations described as evoking negative emotions revealed three clusters of situations and display modes: in situations with unreliable students, teachers most frequently deamplified their negative emotions. In situations relating to non-acceptance of the grading, teachers mostly neutralized their negative emotions, whereas they either expressed or qualified their negative emotions in situations with disturbing students. The results are discussed in relation to the possible function of emotions in different teaching-related situations.

A 16

25 August 2015 11:00 - 12:30

Room Yellow_G3

Symposium

Classroom discourse

Cognitive Aspects of Teaching II: Effects of Teacher Expertise on Teacher-Student Discourse

Keywords: Qualitative methods,Quantitative methods,Social interaction

Sig's: SIG 11 - Teaching and Teacher Education

Chairperson: Matthias Nuckles, University of Freiburg, Germany

Organiser: Andreas Lachner, University of Freiburg, Germany

Organiser: Janneke van de Pol, Utrecht University, Netherlands

Discussant: Fritz C. Staub, University of Zurich, Switzerland

Recent large scale studies underpin the importance of teacher knowledge for effective teaching (e.g., Baumert et al., 2010; Kunter et al., 2013). They provided important insights into the dimensional structure of teacher knowledge and its impact on student achievement. However, research with regard to the analysis of the underlying cognitive processes that constitute teacher expertise remains scarce. In this double-symposium two important aspects of teacher expertise are investigated: (1) teacher vision (symposium I), and (2) teacher-student discourse (symposium II). In this symposium, the role of teacher expertise in teacher-student discourse ñ as a crucial and common aspect of everyday teaching practice ñ is further scrutinized in four studies. The first contribution describes how teachers professionally develop adaptive expertise in identifying and responding to students' ideas. The second contribution investigates how teaching expertise and students' level of achievement differently account for the level of adaptive support they receive. The third contribution examines how teaching expertise affects the effectiveness of instructional discourse strategies. The fourth contribution examines which knowledge-base (content vs. pedagogical knowledge) leads to the most effective instructional explanations for students' learning. Focusing on teacher expertise in teacher-student discourse, these four studies form a coherent whole. The scientific value of the symposium lies in disentangling the role of teacher expertise in teacher-student discourse. The concrete directions that are relevant for educational practice and more specifically for teacher professional development are discussed in this symposium which adds to the educational relevance.

The influence of learning progressions and professional development on teachersí adaptive expertise

Mixed-method research,Instructional design,Teacher professional development,Misconceptions,Biology ,Secondary education

Erin Marie Furtak, University of Colorado at Boulder, United States; Katharina Kiemer, Technische Universitat Munchen (TUM), Germany; Rebecca Swanson, University of Colorado Boulder, United States; Vanessa deLeon, University of Colorado Boulder, United States;

Per definitionem experts exhibit the trait of efficiency. Hatano and Inagaki (1986) argued that expertise also involves innovation, ìthe ability to respond effectively and productively to new situations and new knowledge as it developsî (Redish & Hammer, 2009, p. 630). Experts who exhibit both have been called adaptive experts. When applied to teachersí enactment of formative assessment, teachers may exhibit adaptive expertise when they are able to create learning environments in which students are able to share their ideas, as well as to listen to and interpret these ideas. In this study we explore the extent to which teachers exhibit adaptive expertise in a learning environment centered around a learning progression. To this purpose, teachers (N = 9) were engaged in monthly, on-site professional development meetings centered on a multi-dimensional learning progression. Information was gathered from different data sources in Y1 and Y4: semi-structured interviews, expert ratings of formative assessment activities, video analysis of talk formats and an achievement measure. Results indicate patterns of change across

teachers in alignment with the purpose of the professional development to support teachersí interpretation of student ideas and their classroom enactment of formative assessment with a learning progression, indicating not only the possible advantages of the professional development approach on classroom enactment, but also adaptive expertise as a possible underlying mechanism.

Smart students receive more adaptive support

Quantitative methods,Teaching/instruction,Social interaction,Interdisciplinary,Secondary education

Janneke van de Pol, Utrecht University, Netherlands; Astrid M.G. Poorthuis, University of Amsterdam, Netherlands; Tim Mainhard, Utrecht University , Netherlands; Mieke Brekelmans, Utrecht University, Netherlands;

Given the effectiveness of adaptive support, adaptivity levels are preferably high in education. Yet, much variation exists between and within teachers. In the current study, we sought to shed more light on the extent to which adaptivity can be considered a dyadic construct and what factors bring about these differences in support adaptivity. On the student level, student achievement is expected to affect support adaptivity as teachers are ñ according to the egocentric bias hypothesis ñ better able to diagnose high-achievers and thus adapt to high-achievers than to low-achievers. On the teacher level, teacher expertise is expected to affect support adaptivity; adapting support is a complex activity and as experts (that is, more experienced teachers) have more grip on the subject-matter, more attention can be paid to the individual student. Six-hundred and seven students filled out an adaptivity questionnaire about 62 teachers (total nr of dyads = 1561). We found that student achievement level predicted support adaptivity; high-achievers experienced higher levels of adaptive support than low-achievers. Teacher expertise was not predictive of support adaptivity. The current study is one of the first studies that investigated to what extent teacher and student determine support adaptivity. Our findings suggest that the student plays an important role in degree of support adaptivity that he or she receives, adding to our understanding of the concept of adaptivity being a dyadic construct. On a practical level, teachers might need to become aware of their (probably unintended) differential adaptive behaviour.

Interactivity fosters learning ñ But expert tutors are less interactive than novice tutors

Comparative studies,Teaching/instruction,Biology ,Higher education

Stephanie Herppich, University of Freiburg, Germany; Joerg Wittwer, University of Freiburg, Germany; Matthias Nuckles, University of Freiburg, Germany; Alexander Renkl, University of Freiburg, Germany;

Instructional strategies have a major impact on learning. The effectiveness of tutoring is often attributed to those instructional strategies facilitated by the one-on-one discourse that enable interactive communication between a tutor and a student (e.g., a tutorís scaffolding). However, tutors, in general, are often not optimally interactive, with expert tutors seemingly being more

interactive than novice tutors. In this study, we examined the relationship between the degree of interactivity of a tutorís strategies, the tutorís teaching expertise and a studentís learning. To do so, we compared the tutoring discourses of 21 expert tutors (i.e., biology teachers) and 25 novice tutors (i.e., university students of biology) who worked through a text on the human circulatory system with seventh grade students. Results showed that interactivity particularly promoted complex deep level learning. Contrary to previous results, novice tutors more often used interactive strategies than expert tutors and promoted learning more as a consequence of being interactive. So far, researchers have either directly compared the instructional strategies of expert tutors and novice tutors within a procedural domain. Or they have compared expert tutors tutoring a procedural domain and novice tutors tutoring a conceptual domain. Our puzzling result may thus be due to the conceptual tutoring domain studied for expert tutors and novice tutors. They imply that analyses of expert tutorsí and novice tutorsí instructional strategies should take into account the nature of the domain to be covered.

Teachersí academic content knowledge allows generating effective explanations

Comparative studies,Student learning,Teaching/instruction,Mathematics

Andreas Lachner, University of Freiburg, Germany; Matthias Nuckles, University of Freiburg, Germany;

In two studies, we investigated how teachersí content knowledge and pedagogical content knowledge affected the effectiveness of instructional explanations. We asked two distinct expert-groups, 15 mathematicians with high academic content-knowledge and 20 mathematics teachers with high pedagogical content-knowledge to provide an explanation of extremum problems for a potential 11th- grade student. Specifically, we compared the process-orientation of their explanations, as this feature has proven to be an important scaffold to support studentsí understanding. We found that the process-orientation of explanations was only related to the participantsí content knowledge, and not to their pedagogical content knowledge. Additionally, analyses revealed that the mathematiciansí explanations contained more process-oriented statements, whereas mathematics teachersí explanations contained more product-oriented statements. In Study 2, we compared the effectiveness of these semantically different explanations with regard to studentsí learning. We found that students learning with process-oriented mathematiciansí explanations outperformed students learning with product-oriented mathematics teachersí explanations on a posttest. Thus, subject-matter expertise can be regarded as a crucial prerequisite for providing effective instructional explanations. Apparently, sophisticated content knowledge allows generating process-oriented explanations that serve as a valuable scaffold for students to deeply understand mathematical procedures.

A 17

25 August 2015 11:00 - 12:30

Room Yellow_G1

Symposium

Instructional design

The effect of generation and collaboration in Productive Failure and Invention approaches

Keywords: Cooperative/collaborative learning,Experimental studies,Instructional design,Learning approaches,Teaching/instruction

Sig's: SIG 6 - Instructional Design

Chairperson: Nikol Rummel, Ruhr University Bochum, Institute of Educational Research, Germany

Organiser: Katharina Loibl, University of Education Freiburg, Germany

Organiser: Nikol Rummel, Ruhr University Bochum, Institute of Educational Research, Germany

Discussant: Lennart Schalk, ETH Zurich, Switzerland

In Productive Failure and Invention approaches (PF&I), learners engage in a preparation activity (e.g., they generate solutions to unfamiliar problems) before they receive explicit instruction. While the overall effectiveness of PF&I (usually implemented in a collaborative setting) as compared to instruction-first approaches has been shown in multiple studies, it is still unclear which components render PF&I effective. The studies presented within this symposium focus on two potential components: generation and collaboration. Kapur shows advantages for collaborative PF&I over instruction-first and within PF&I for generation over evaluation activities. In another study, however, collaborative generation did not yield better learning results than individual generation. Similarly, Mazziotti and colleagues failed to find evidence for an advantage of collaborative over individual generation. Thus, it seems that collaboration only plays a role in conjunction with other factors such as the type of the preparation activity. Indeed, Glogger and colleagues demonstrate that generation was most successful in an individual setting, but worked example study benefited from collaboration. In contrast to the previous contributions, Lam does not focus on the effect of collaboration during generation, but on the effect of generation on collaboration. She shows that a generation activity is more useful for preparing students for subsequent collaboration than explicit instruction. The divergent findings suggest the need to develop a theoretical model that encompasses the conditions and processes influencing the PF&I outcomes. As a first step, all contributions discuss how the learning activities proposed by Chi's ICAP framework may provide a useful model to explain the results.

Examining the ICAP hypothesis through evidence from studies on Productive Failure

Experimental studies,Instructional design,Learning approaches,Mathematics,Secondary education

Manu Kapur, National Institute of Education, Singapore;

I will discuss evidence from three studies on Productive Failure (PF) in relation to Chiís ICAP framework. In Study 1, I compare learning from PF with Direct Instruction (DI). In PF, learners work collaboratively to generate solutions to a design problem before receiving instruction. In DI, students first receive instruction on the concept before collaboratively solving the same design problem as PF students. Findings suggested that PF students significantly outperformed DI students on conceptual understanding and transfer, without compromising procedural knowledge; a finding that is consistent with the ICAP hypothesis. In Study 2, I compare learning from PF and vicarious failure (VF). In VF, learners work collaboratively to study and evaluate their peer-generated solutions before receiving instruction. From the ICAP lens, both conditions can be seen as interactive, just that one is more interactive than the other due to the nature of the generative versus evaluative tasks in PF and VF respectively. Findings are consistent with ICAP hypothesis that the more interactive the learning activity, the greater the learning. PF students outperformed VF students on conceptual understanding and transfer. In Study 3, I compare individual generation (constructive) versus group generation (interactive) in learning from PF. Findings suggested there was no significant difference between individual or group generation when learning from PF; a finding that is inconsistent with the ICAP hypothesis. I will discuss these three sets of findings, and derive implications for both the ICAP framework as well as the design of Instruction to teach novel concepts.

Investigating the role of collaboration within Productive Failure

Experimental studies,Instructional design,Student learning,Peer interaction,Mathematics,Cooperative/collaborative learning

Claudia Mazziotti, Ruhr-University Bochum, Germany; Katharina Loibl, University of Education Freiburg, Germany; Nikol Rummel, Ruhr University Bochum, Institute of Educational Research, Germany;

Learning approaches comprising phases of initial problem solving and delayed instruction such as Productive Failure (PF) have been proven effective for the acquisition of conceptual knowledge. Although the problem-solving phase is usually implemented in a collaborative setting, the role of collaboration for the effectiveness remains unclear. In two quasi-experimental studies we aimed to investigate whether collaborative as compared to individual learning in PF leads to more conceptual knowledge. We also tested whether the beneficial effect of PF could be replicated with students of a much younger age group: previous studies were conducted with high-school or university students, we worked with German fourth and fifth graders. Results of our first study replicated the PF effect with our young sample. However, the study did not reveal significant differences between collaborative or individual problem solving in PF. Our second study aimed at replicating the first study with a larger sample size. We found a surprising, significant difference between students learning collaboratively and students learning individually, independent of the timing of instruction: Individual learners outperformed their collaborative counterparts both in the PF and in the Direct Instruction conditions (DI) where they first received instruction and then solved a problem. Possibly collaboration caused an additional cognitive load which impeded the acquisition of conceptual knowledge. We aim to open a discussion about the prerequisites that make PF productive.

Together or better alone - Which social setting fits invention and worked examples?

Experimental studies,Instructional design,Problem solving,Mathematics,Higher education,Cooperative/collaborative learning

Inga Glogger-Frey, University of Freiburg, Institute of Psychology, Germany; Anne-Katrin Treier, Institute of Psychology, University of Freiburg, Germany; Alexander Renkl, University of Freiburg, Germany;

Theoretically, both inventing a problem solution and self-explaining a worked solution of the problem can foster constructive processes to prepare learning from subsequent direct instruction. Such preparatory tasks can foster understanding and transfer. With respect to the superiority of inventing tasks or worked-examples task as preparatory activities, recent studies found inconsistent findings. These inconsistencies might be due to variations in whether individuals or small groups worked on these tasks. In the present experiment, we systematically varied if the preparation activities were done in an interactive group setting versus an individual setting. Fifty-eight students of psychology worked on an inventing activity or a worked-examples activity before receiving direct instruction about measures of variability, either individually or in triads (2x2 design). We measured cognitive and motivational processes during the preparation activity. We obtained two main findings. First, individual work fitted better with inventing and work in small groups fitted better with studying worked-example. This pattern of results held for motivation and elaboration during learning. Second, we found that the inventing activity and the worked-examples activity lead to comparable learning outcomes that were, however, mediated by different processes. Our findings suggest that present theoretical approaches on constructive preparation activities should be enriched (a) by explicit considerations about the social learning setting as well as (b) by more fine-grained considerations about relevant cognitive and motivational processes.

Designing for Productive Failure with ICAP: How cognitive preparation affects collaborative learning

Experimental studies,Student learning,Learning approaches,Social sciences,Higher education,Cooperative/collaborative learning

Rachel Lam, National Institute of Education / Nanyang Technological University, Singapore;

This work investigates the effects of two preparation activities on subsequent collaboration; generation of representations on unfamiliar content compared to explicit instruction of the content. The instructional tasks were modeled after the Productive Failure (PF) phases of exploration and consolidation (Kapur & Bielaczyc, 2012). However, rather than receiving direct instruction, students collaborated in the consolidation phase. Generative preparation was found to improve learning during collaboration to a greater degree than explicit instruction, supporting the prior work on PF showing a benefit of generative exploration compared to receiving direct instruction at the onset of learning. This finding also falls in line with Chiís (2009) ICAP (Interactive-Constructive-Active-Passive) framework, which theorizes that a ìConstructiveî activity is more beneficial for learning when compared against an ìActiveî activity. Moreover,

students in the generation condition performed as well as their counterparts (who received explicit instruction) on a posttest measuring conceptual understanding, although they were never taught the canonical representations. Thus, students achieved productive failure without explicit instruction. Provided these findings, I claim that knowledge consolidation is possible during collaboration when students first prepare by engaging in generative or ìconstructiveî activities.

A 18

25 August 2015 11:00 - 12:30

Room Brown_B8

Symposium

Cognitive development

Multiple perspectives on young children's cognitive and emotional responses to scientific activities

Keywords: Cognitive development,Early childhood education,Emotion and cognition,Experimental studies,Metacognition,Reasoning

Sig's: SIG 5 - Learning and Development in Early Childhood

Chairperson: Christine Howe, University of Cambridge, United Kingdom

Organiser: Ornit Spektor-Levy, Bar-Ilan University, Israel

Discussant: Paul Leseman, Utrecht University, Netherlands

Although studies conducted over the past two decades have provided compelling data about children's cognitive abilities that would enable them to understand scientific concepts, and to demonstrate abilities needed for scientific exploration, further research is needed to gain a better understanding of the nature and development of these abilities. This symposium draws together multiple perspectives on young children's scientific abilities. All are contextually situated, engaging children with scientific phenomena, analyzing children's predictions, reasoning, and behavior. Notwithstanding their common focus, the contributions vary in cultural background, theoretical, and methodological details. The first study explores the development of the concept of air pressure from the perspective of embodied cognition, to shed light on the role of predictions and the way prediction and explanation develop in micro- and macro-time. The second study demonstrates the beneficial effect of the spontaneous use of representational means (e.g. drawing, using modeling clay) in the articulation of scientific knowledge in on-going scientific activities. The third study explores the effects of a dialogic and metacognitive intervention on young children's conceptual understanding, scientific reasoning and declarative metacognition in a floating and sinking prediction task. The fourth study explores children's scientific curiosity, attitudes toward science, predictions, and reasoning by employing special

procedure to document and analyze preschoolers' responses to the foamy reaction of yeast to sugar and water. These papers underline the relevance of providing theoretical concepts and empirical results that may promote an evidence-based discussion on early science education across different educational systems.

Childrenís conceptions of air pressure: Predictions and explanations in an embodiment context

Experimental studies,Cognitive development,Reasoning,Science education,Early childhood education,Primary education

Willemijn Schot, Utrecht University, Netherlands; Marja van den Heuvel-Panhuizen, Utrecht University, Netherlands; Jan Boom, Utrecht University, Netherlands; Paul Leseman, Utrecht University, Netherlands;

This study aims to contribute to understanding the nature and development of scientific knowledge in primary school children by studying the development of the concept of air pressure from the perspective of embodied cognition. We let children (grade 1, 3 and 5) gain action-perception experience with the phenomenon air pressure through a series of related tasks. Some children are asked to predict and explain what would happen in each task and describe what happened and why afterwards. Others do not have to state their predictions prior to doing the tasks. This way we can shed light on the role of predictions and on the way prediction and explanation develop in micro- and macro-time. In line with the embodied cognition framework, we hypothesize that predictions and explanations will be contextually situated, which will imply that they will not necessarily develop synchronously and that explanations of varying complexity will exist alongside each other.

The use of representational means in the articulation of scientific knowledge by young children

Experimental studies,Cognitive development,Reasoning,Science education,Early childhood education,Learning in context

Esther Adi-Japha, Bar-Ilan University, Israel; Yona Simcha BarTov-Sechter, Bar Ilan University, Israel;

The use of drawings made by children as part of science education has been shown to benefit science learning. However, kindergarten children experiencing scientific activities may feel that drawing is "childish", not appropriate for academic activities, and they seem to want their pictures to ìlook niceî rather than to adhere to the taskís requirements. These difficulties may be resolved if drawing is encouraged as a spontaneous articulation of scientific knowledge for personal use. One-hundred-and-twenty children took part in a series of scientific activities. Some of the activities included children's use of representational means (free drawing and use of modeling clay, and structured activity with building materials). Sixty children were excluded from these representational activities and were given more time to ask questions. All children were assessed in the month that preceded the first activity, and 4-8 weeks following the last

activity using a 20-item questionnaire. Children were given the opportunity to use markers or modeling clay while answering the questionnaire. Children who made use of drawing and modeling clay scored higher on the pre-activities questionnaire. Following the scientific activities, the group that was exposed to representational experiences made significantly more use of drawing and modeling clay while answering the questionnaire and gained higher scores. Furthermore, gains in this group increased with the increase in the use of drawing and modeling clay. These findings underscore the benefits of spontaneous use of representational means in association with scientific activity.

Impact of a metacognitive intervention on young childrenís understanding of floating and sinking

Experimental studies,Cognitive development,Metacognition,Reasoning,Science education,Primary education

Deborah Pino-Pasternak, Murdoch University, Australia; David Whitebread, University of Cambridge, United Kingdom; Penny Coltman, University of Cambridge, United Kingdom; Christine Howe, University of Cambridge, United Kingdom;

This quasi-experimental study explored the effects of a dialogic and metacognitive intervention on young childrenís scientific reasoning and declarative metacognition in a floating and sinking prediction task. 74 children (42 female) with a mean age of 5 years 7 months (SD= 3.7) attending 9 schools in the UK participated in this study (Intervention n=51, Comparison n=23). The intervention consisted of 8 group problem-solving activities with 3 activities in the curriculum area of Science, 3 in Arts, and 2 Talk activities which aimed at promoting the sharing of ideas through dialogue. The pre-post science assessment task encouraged children to: (a) predict the extent to which a set of 6 ambiguous objects would float or sink; (b) test their hypothesis; and (c) reclassify objects on the basis of evidence. Responses to a structured assessment interview were scored in terms of conceptual understanding of science, quality of reasoning, and metacognition, and were subjected to non-parametric analyses. Results revealed a whole group effect of the intervention only for the metacognitive variable. Median split analyses revealed that children who showed lower initial scores in metacognition and conceptual levels evidenced the most significant improvements after the intervention. Outcomes suggest the theoretical and educational relevance of further exploring relationships between the early development of metacognition and scientific reasoning in early childhood.

Young children's scientific curiosity and cognitive abilities during scientific engagement

Mixed-method research,Cognitive development,Emotion and cognition,Reasoning,Science education,Early childhood education

Yael Kesner Baruch, Bar-Ilan University, Israel; Ornit Spektor-Levy, Bar-Ilan University, Israel; Zemira Mevarech, Bar Ilan University, Israel;

Positive attitudes toward science, feeling curious to learn science, and perceiving science as interesting are all factors that predict scientific engagement and achievement in the long run.

Studying attitudes, cognitive abilities, and curiosity at an early age, where verbal expression can be difficult, is challenging. The present study aims to explore young children's emotional and cognitive aspects of scientific engagement (e.g. scientific curiosity, attitudes toward science, and exploration abilities such as predictions and reasoning) from an ecologically validated perspective: observation of their responses during engagement in a scientific activity demonstrating the foamy reaction of yeast to sugar and water (anaerobic respiration). The sample comprised 64 preschool children (aged M=64 months, SD=8.3). An integrated quantitative-qualitative tool was developed: A Scientific Demonstration with Documented Response Questionnaire (SDDRQ). The SDDRQ examines childrenís verbal and behavioral responses as indicators of inquiry abilities (asking questions, describing an observation, making predictions, scientific reasoning), curiosity, and attitudes toward science. Data analysis revealed that all the direct questions concerning childrenís attitudes and curiosity toward the scientific phenomena received, on average, a relatively high score. The childrenís verbal and behavioral expressions were categorized into four main aspects: emotional, cognitive, sensomotoric and social. Significant positive correlations were found within each of the four main aspects. Overall, the average score of the cognitive aspect was higher than other aspects. Girls exhibited more sensomotoric behaviors than boys.

A 19

25 August 2015 11:00 - 12:30

Room Blue1_C1

Symposium

Conceptual change

Learning and conceptual change in business and economics studies

Keywords: Conceptual change,Higher education,Misconceptions,Reasoning,Secondary education,Social sciences

Sig's: SIG 3 - Conceptual Change

Chairperson: Eveline Wuttke, Goethe-Universitat Frankfurt, Germany

Organiser: Carmela Aprea, Friedrich-Schiller-University Jena, Germany

Organiser: Cecilia Lundholm, Stockholm University, Sweden

Discussant: David Leiser, Ben Gurion University of the Negev, Israel

Given the economic challenges that most European countries are currently facing, the ability to reasonably deal with economic and financial matters as well as a sound understanding of these matters are becoming increasingly essential competences not just for professionals in the field of

business and economics (e.g., in the sector of investment and banking) but for every person responsible for coping with the challenges of his or her everyday life. Moreover, these competences must also be regarded as key components of political and citizenship education in a democracy. Thus, their promotion ought to be a core concern for every educational system. This necessity, in turn, presupposes the availability of a theoretically backed and empirically validated scientific knowledge base which helps to support pedagogical and instructional decision making. As with any other educational endeavour, this knowledge base should, inter alia, preferably provide answers to the following questions: . What prior or na?ve understandings do students have about economic issues, and which specific comprehension problems or misunderstandings might occur?. How do these understandings change over time, and how can these changes be adequately measured?. What instructional strategies are most effective for supporting changes that move from naive to expert understanding?The symposium aims to address these questions by bringing together research data from five coun-tries (United Kingdom, Sweden, Germany, Switzerland and Italy) and from two levels of the educa-tional system (i.e., secondary schools and university). Moreover, qualitative as well as quantitative research approaches are represented.

Italian and Swiss adolescents' and young adults' naive understandings of the economic crisis

Conceptual change,Misconceptions,Social sciences,Secondary education

Carmela Aprea, Friedrich-Schiller-University Jena, Germany; Viviana Sappa, Swiss Federal Institute for Vocational Education and Training (SFIVET), Switzerland; Anna-Maria Ajello, La Sapienza Roma, Italy; Anna Emilia Berti, University of Padova, Italy; Antonella Marchetti, Universita Cattolica Milan, Italy; Elisabetta Lombardi, La Sapienza, Roma, Italy; Ilaria Castelli, Universita Cattolica, Milan, Italy; Davide Massaro, Universita Cattolica, Milan, Italy; Annalisa Valle, Universita Cattolica, Milan, Italy;

The investigation of naive understandings has a longstanding tradition especially in science learning. In contrast, comparable efforts concerning studentsí naive understandings of economic issues are relatively scarce. The research study to be presented here aims to contribute to filling this gap by exploring adolescentsí and young adultsí naive understandings of the economic crisis. It intends (a) to describe these understandings, and (b) to identify possible differences with regard to gender, school level and economic background as well as to explore whether and how they may vary for countries in which the crisis is more noticeable than in others. A total of 658 respondents of the target group from Italy and Switzerland filled in an open-ended questionnaire in which they were asked to explain what they perceive as causes of the crisis, and what they think are possible remedies that governments can take against it. Besides, they were also asked whether they feel that the crisis has an impact on their personal life. Analyses of the data encompassed inductive content categorical analyses as well as descriptive and comparative analyses. Among others, 22 categories of perceived causes emerged which can be grouped into three broader visions: a) a vision which attributes the crisis to systemic and international factors b) a vision which cites specific national factors and c) a personalized vision which interprets the economic crisis in terms of troublesome individual consequences. Moreover, significant differences between the various sub-groups of the sample occurred.

Swedish upper secondary school students' conceptual formation of environmental costs and prices

Phenomenography,Conceptual change,Environmental education,Social sciences

Caroline Ignell, Stockholm University, Sweden; Peter Davies, University of Birmingham, United Kingdom; Cecilia Lundholm, Stockholm University, Sweden;

This paper addresses students/ conceptual formation regarding costs of negative environmental impact and presents an investigation on the understanding of economic pricing and the environment. It is an interview study with 15 students following earlier work (Ignell, Davies and Lundholm, 2013) on how upper secondary school students view negative environmental impacts as mirrored in price, where the results showed that 14 of 110 of the students made minor references to environmental impact in explanations of prices for various goods generating environmental degradation. The results of the present study show that change of conceptions and the learning process is not straightforward as in moving from one aspect (supply), to understanding supply and demand as an interaction of both. Also, studentsí environmental considerations vary in relation to how price for e.g. beef burgers are arranged. Environmental impacts are referred to in terms of references to production costs from almost all participants and demand references are less frequently described.

Using knowledge networks to measure conceptual understanding and conceptual change in economics

Assessment methods and tools,Conceptual change,Engineering,Higher education

Baerbel Fuerstenau, Dresden University of Technology, Germany; Hartmut Oldenburger, University of Gottingen, Germany;

In order to support students in understanding, developing, and modifying complex concepts their knowledge has to be diagnosed. The diagnosis of knowledge requires its depiction and modeling. Knowledge networks seem to be a suitable measure for reconstructing complex knowledge as a relational system. In order to assess knowledge networks several scoring techniques have been used, such as the number, existence or accuracy of concepts and/or propositions, coherence or diameter of the networks. However, the work already done can be complemented by using models and measures strongly combining quantitative scores and the content dimension of networks as well as qualitative and quantitative research tradition. The contribution will exemplify this approach using data about studentsí conceptions of successfully starting up a business. The results will allow us to define content valid and concrete starting points for effectively supporting adequate conceptual change in the process of teaching and learning.

Developing reasoning in business studies through a literacy intervention

Experimental studies,Instructional design,Reasoning,Social sciences

Joanne Bentham, King Edward VI High School, Stafford, United Kingdom; Peter Davies, University of Birmingham, United Kingdom; David Galbraith, University of Southampton, United Kingdom;

This paper describes an exploratory trial conducted with 14-15 year-old students in English state schools who were studying business start-ups as part of a course in ëBusiness Studiesí. Students participating in the trial were randomly assigned to an intervention or control group within each class in each participating school. The intervention uses a ëStory Grammarí strategy to improve studentsí reasoning by increasing the frequency and complexity of their use of ëconnectivesí such as ëwhení, ëifí and ëbecauseí. The analysis reports positive effects of the intervention on studentsí understanding as judged by the use of a standard examination style mark scheme, and the number and complexity of connectives used by students in their extended writing. By reporting effects on immediate target variables we are able to examine the causation with precision. Effects are reported through standard t-tests and effect size. We also discuss the design of the experiment and comment on its practicability as a model for investigating effects of classroom interventions.

A 20

25 August 2015 11:00 - 12:30

Room Yellow_G2

Symposium

Teacher professional development

Pre-Service and In-Service Teachersí Professional Knowledge: Diagnose, Intervention, and Change

Keywords: Pre-service teacher education,Science education,Teacher professional development

Sig's: SIG 11 - Teaching and Teacher Education

Chairperson: Fien Depaepe, KU Leuven, Belgium

Organiser: Annette Tettenborn, Institut fur padagogische Professionalitat und Schulkultur, Switzerland

Organiser: Henrik Saalbach, University of Leipzig, Germany

Discussant: Robin Stark, Saarland University, Germany

The relevance of teachers' competencies for research on learning and instruction is twofold: First, teachers' Teachers' knowledge, beliefs, and instructional strategies affect whether and how students acquire knowledge. Second, teachers themselves often carry misconceptions about

specific contents, the nature of learning, or effective instructions. Therefore, research aiming at defining, investigating and developing teachers' professional competencies, in general, and professional knowledge, in particular, is a promising path in order to enhance instruction and learning. Teachers' professional knowledge is commonly conceptualized by three core dimensions: content knowledge (CK), pedagogical content knowledge (PCK), and generic pedagogical knowledge. The papers of this symposium target different dimensions of teachers' professional knowledge and their change through professional teacher education and development. The first study examines the effect of an innovative research-based training on improving pre-service elementary school teachers' CK and PCK with respect to teaching rational numbers. The second paper investigates whether kindergarten teachers' construal of (science) learning as conceptual change is related to specific scaffolding activities, and whether a shift in their beliefs induced by a professional development program is reflected by a change in their scaffolding activities. The third study analyzes teachers' occupational coping patterns depending on their contextual features and their relation to pedagogical content beliefs. The final paper of the symposium reports about a study on the development of generic pedagogical knowledge of pre- service science and mathematics teachers. Here, the researchers examine the assumption that the coherence in teachers' knowledge is a function of explicit learning opportunities.

Improving pre-service teachersí content and pedagogical content knowledge on rational numbers

Pre-service teacher education,Teacher professional development,Conceptual change,Mathematics

Fien Depaepe, KU Leuven, Belgium; Patrick Van Roy, KU Leuven, Belgium; Joke Torbeyns, KU Leuven, Belgium; Lieven Verschaffel, KU Leuven, Belgium; Wim Van Dooren, KU Leuven, Belgium;

The rational number domain is typically a difficult curricular domain for elementary school students. To appropriately deal with studentsí difficulties, teachers need well-developed content knowledge (CK) and pedagogical content knowledge (PCK) in the rational number domain. Unfortunately, recent studies revealed serious gaps in (pre-service) teachersí rational number CK and PCK. We conducted an intervention study with a pretest-posttest design addressing CK and PCK on rational numbers. In an experimental condition 142 pre-service teachers participated in a 14h lesson series on (teaching) rational numbers. The pillars of the lesson series were: (1) emphasizing studentsí misconceptions about rational numbers, (2) introducing a broad range of instructional strategies and representations to teach rational numbers, and (3) fostering a close connection with regular classroom situations. The control condition, in which 138 pre-service teachers were involved, consisted of a traditional 14h lesson series on (teaching) rational numbers, differing from the experimental lesson series with respect to the three pillars. The results revealed that the growth in pre-service teachersí CK and PCK was significantly higher in the experimental than in the control condition. We discuss the implications of these results from both a scientific and educational point of view.

Effects of a professional development intervention in early science instruction

Video analysis,Teacher professional development,Conceptual change,Science education

Ueli Studhalter, ETH Zurich, Switzerland; Annette Tettenborn, Institut fur padagogische Professionalitat und Schulkultur, Switzerland; Miriam Leuchter, University of Munster, Germany; Henrik Saalbach, University of Leipzig, Germany; Anneliese Elmer, Universitat Saarland, Germany;

Recent research has identified two main factors influencing instructional quality: Effective teacher-child interactions and teachersí beliefs. Professional development programs should thus target teachersí professional beliefs and teachersí scaffolding strategies aiming to foster childrenís learning. The present study examines a professional development intervention for kindergarten teachers focusing on early science instruction, which was developed according to the intentional teaching approach (Hamre, Downer, Jamil, & Pianta, 2012). The design of this study including 49 teachers and 673 children allows for an analysis of the effect of the intervention on teachersí beliefs, their scaffolding behavior, and childrenís learning. We found that teachers participating in the professional development intervention (PD-group) showed a significant shift in their beliefs towards more constructivism-based orientations relative to a group of teachers which only received an instruction in using the material (Instruction-only-group) and relative to a non-intervention group. Furthermore, our findings revealed an intervention effect on childrenís learning in the two intervention groups relative to the non-intervention group. However, the learning gains of children in the PD-group did not differ from those in the Instruction-only-group. Finally, relations between teachersí beliefs and their scaffolding behavior suggest that teachersí beliefs can indeed influence their behavior in classroom. The implications of these findings for research on professional development in early education will be discussed.

How is occupational stress and coping related to pedagogical content beliefs in pre-service teachers

Pre-service teacher education,Teacher professional development,Self-regulation,Higher education

Daniela Nussbaumer, ETH Zurich, Switzerland; Henrik Saalbach, University of Leipzig, Germany; Roland H. Grabner, University of Graz, Austria;

Recent studies identify several areas of competence important for effective teaching. One of these competencies are self-regulatory abilities that include successful coping with occupational stress. To what extent this ability depends on particular features of the teacher education program, however, is less clear. In addition, few studies have investigated the relation between this ability and pedagogical content knowledge, reflecting another central competence. In the present study, self-regulatory abilities and pedagogical content knowledge were assessed in a sample of 192 pre-service secondary school teachers for science and mathematics from Switzerland using the Occupational Stress and Coping Inventory (AVEM; Schaarschmidt & Fischer, 2001) and two instruments which have been particularly developed to measure pedagogical content beliefs with science and mathematics teaching (Kleickmann, 2008; Voss, Kleickmann, Kunter, & Hachfeld, 2011). In contrast to previous findings in German students, the

present study reveals a more positive distribution of coping patterns for Swiss pre-service teachers: About 50% (compared to less than 20%) show a ìhealthy-ambitiousî pattern. Risk patterns (either the ìexcessively-ambitiousî or the ìresignedî pattern) are at about 20% in the present study (compared to 60%). These striking differences are attributed to structural differences between the teacher education approaches and resulting personal differences between students. Furthermore, we found a relation between the abilities of occupational coping patterns and pedagogical content knowledge. Pre-service teachers with the ìhealthy-ambitiousî pattern show higher constructivist beliefs than those with the ìresignedî pattern.

Preservice teachersí pedagogical knowledge: From fragmented to more coherent knowledge?

Pre-service teacher education,Teacher professional development,Science education,Higher education

Thilo Kleickmann, Leibniz Institute for Science and Mathematics Education, Germany; Judith Pollmeier, Leibniz Institute for Science and Mathematics Education (IPN), Germany;

Although general pedagogical knowledge is considered one of the key categories of teachersí professional knowledge, research has just started to investigate how it develops during preservice teacher education. Beyond quantitative change, PK development involves qualitative development from fragment knowledge to more coherent knowledge. The present paper investigates whether preservice teachers show growing coherence in their pedagogical knowledge in the course of their university studies. The results of an observational field study with 1,034 preservice secondary science and/or mathematics teachers, and the results of an experimental study with 100 preservice elementary teachers suggest qualitative changes in preservice teachersí PK beyond quantitative knowledge growth. Growing coherence in teacher candidatesí PK emerged as a function of explicit and coherent learning opportunities. Constructing more coherent PK curricula for teacher education as well as aligning courses on PK and courses on pedagogical content knowledge might be a lever for reform in teacher education.

A 21

25 August 2015 11:00 - 12:30

Room Yellow_G4

Symposium

Technology-enhanced learning

Keeping an eye on information literacy: Investigating information problem solving with eye tracking

Keywords: Comprehension of text and graphics,Computer-assisted learning,E-learning/ Online learning,Educational technology,Quantitative methods

Sig's: SIG 27 - Online Measures of Learning Processes

Chairperson: Saskia Brand-Gruwel, Open University, Netherlands

Organiser: Halszka Maria Jarodzka, Open University, Netherlands

Organiser: Saskia Brand-Gruwel, Open University, Netherlands

Discussant: Kenneth Holmqvist, Lund University, Sweden

Information problems are a popular educational method (often executed on the internet): students identify which information is needed, detect it in corresponding sources, extract and organize it per source, and merge relevant information from different sources (Brand-Gruwel, Wopereis, & Vermetten, 2005). To accomplish this, elaborate information literacy skills are needed (e.g., Bawden, 2001). Brand-Gruwel and colleagues (2005) claim that these skills cannot be taken for granted, but require intense instruction. The current symposium analyzes the nature of information literacy and ways of promoting it. All presentations use eye tracking to gain unique insight into perceptual and cognitive processes, such as search and selection of information (Holmqvist et al., 2011). Argelagos and Piffarre characterize information problem solving strategies of students with differently elaborated information literacy and relate these to their task performance. Walhout and colleagues show the need to adapt problem solving strategies to the type of problem as part of elaborated information literacy. Kammerer and colleagues find that information literacy skills can be indirectly stimulated by confronting students with controversial information from diverse sources. Amadieu and colleagues show that certain information literacy skills (here: concept mapping) can be directly promoted by instructional support (here: signaling). Finally, the discussant, Prof. Holmqvist, elaborates on how latest developments in eye tracking can provide even more insight into information literacy and what conclusions can be drawn for educational practice.

Characterizing web search patterns during WebQuests: an explorative eye-tracking study

Mixed-method research,Educational technology,Comprehension of text and graphics,Science education,Computer-assisted learning

Esther Argelagos, University of Lleida, Spain; Manoli Pifarre Turmo, University of Lleida, Spain;

The World-Wide-Web (WWW) is an information source that is increasingly often used to search information for solving problems, such as school or university assignments. The aim of this study was to characterize patterns of how people search for information on the WWW and how these patterns are related to the efficiency of solving complex information problems. Therefore, a WebQuest was designed, which is a hypermedia environment that guides information search on the WWW on a certain topic. In the current study, participants were asked to investigate to which extent live would be possible on the planet Mars. During the WebQuest, they had to find different facts about the planet, but also to write an essay about the possibilities of living on the planet Mars. Sixteen PhD students and university staff in the field of the Learning Sciences and

Technologies participated on a voluntary basis in this study. During individual sessions, participants performed the WebQuest for 45 minutes. While doing so, their eye-movements were tracked. The recordings of each participant were transcribed as descriptions of all actions made on the screen by means of mouse, keyboard and including eye-movements. As a result, descriptive protocols were obtained through this transcription process and analyzed with a coding scheme. Three web-search patterns of different efficiencies could be identified, which allowed us to draw conclusions for educational practice, when teaching information problem solving skills.

Searching with the eye: Does type of task influence viewing behavior in online search?

Quantitative methods,Educational technology,Comprehension of text and graphics,Computer-assisted learning

Jaap Walhout, Open Universiteit, Netherlands; Paola Oomen, Open University of the Netherlands, Netherlands; Saskia Brand-Gruwel, Open University, Netherlands;

The aim of this study is to understand the influence of the type of task on studentsí search behavior when solving an information problem. The participants carried out three search tasks via the search engine GoogleÆ: a fact-finding task, a causeñeffect task, and a task concerning a controversial topic. The data were collected using a combination of log files, eye tracking, an online answer form, and thinking aloud. Results revealed that for the cause-effect task participants used more search queries, more search keywords, and considered more search results on the search engine result pages (SERP). In the search task concerning the controversial topic, the least queries and keywords were used and the least search results were considered. Furthermore, the higher a search result is ranked on a search results page, the greater the chance is that this result will be viewed. This was the same for all three tasks. It can be concluded that in this study search behavior is different for different types of tasks. Thus, when teaching information problem solving skills to students different types of web-search tasks, that can be conducted on the Internet, should be taken into account.

How contradictions between web pages stimulate source evaluations

Experimental studies,Quantitative methods,Comprehension of text and graphics,E-learning/ Online learning

Yvonne Kammerer, Knowledge Media Research Center, Germany; Eva Kalbfell, Knowledge Media Research Center, Germany; Peter Gerjets, University of Tuebingen, Germany;

Based on the Discrepancy-Induced Source Comprehension (D-ISC) Assumption, this study investigated whether contradictions between two web pages stimulated university students' source evaluations. For this purpose, students were asked to read two web pages about the effectiveness of a nutritional supplement in order to give informed advice on this issue. The two web pages at first sight both looked trustworthy, stemming from reliable associations. However, ìabout usî information presented at the bottom of the web pages indicated that one of the two web pages had commercial interests. Results indicate that when the two web pages contradicted

each other (with the web page with vested interest presenting positive information and the other presenting negative information), students spent more time reading the web pagesí ìabout usî information and also more frequently included ìabout usî information from the two web pages in their written recommendation than when the web pages provided consistent (positive or negative) information. The students, furthermore, judged the trustworthiness of the commercially-biased web page lower when it contradicted the unbiased web page than when it contained consistent information. To conclude, the findings from the present study corroborate the DIS-C Assumption.

Signaling macro-information in texts to support concept mapping

Quantitative methods,Educational technology,Instructional design,Comprehension of text and graphics,Computer-assisted learning

Franck Amadieu, University of Toulouse, CLLE , France; Julie Lemarie, University of Toulouse , France; Ladislao Salmeron, University of Valencia, Spain; Pierre-Vincent Paubel, University of Toulouse, France; Julien Cegarra , University of Toulouse, France; Aline Chevalier, CLLE, France;

Concept mapping has a high potential to contribute to learning to solve information problems. However, this potential may only unravel if learners can cope with the difficulty of concept mapping itself. Signalling of relational information was hypothesized to facilitate concept mapping and sustain learning, particularly for low prior knowledge learners. This study investigates the effect of signalling on the usefulness of concept mapping in learning. During the first learning session, social science students were trained on concept map building and received a prior knowledge test. During the second session, they were instructed to learn a course on the greenhouse effect by building a concept map from text reading and received comprehension and transfer tests afterwards. Half of the students received a signalled version of the text emphasizing relational macro-information, whereas the other half received a no signal version. Eye movement were recorded during the learning phase. Results indicate that signalling relational macro-information guided the activity of concept mapping and led learners to build more faithful concept maps to the texts. However, no benefit of signalling on inferential activity was observed and learning outcomes were not impacted. Only high prior knowledge supported inferences during concept mapping.

A 22

25 August 2015 11:00 - 12:30

Room Green_A5

Symposium

Learning in context

Learning in and for the medical profession: from formal to informal and beyond

Keywords: Informal learning,Learning in context,Lifelong learning

Sig's: SIG 14 - Learning and Professional Development

Chairperson: Eva Kyndt, University of Leuven, Belgium

Organiser: Katrien Cuyvers, University of Antwerp, Belgium

Discussant: Els Boshuizen, Open University, Netherlands

Developing and sustaining competence in medical practice go beyond the individual possession of knowledge, skills and attitudes. Learning for the medical profession also entails acquiring the ability to apply these competencies in the interplay between the individual and the clinical environment during and across the medical education continuum. This symposium consists of four papers, all related by investigating formal and informal learning in the clinical practice and aiming to present empirical findings to broaden understanding to the corresponding frameworks on informal and formal learning in and for medical practice. As each paper details on a different stage in the medical trajectory, the symposium enables to combine and discuss research on learning from newcomers to newly qualified and licensed physicians, offering a broad perspective on learning. From a methodological viewpoint, the concept of learning is measured in an in-depth qualitative way, using videotapes and interviews enabling to capture an enriching perspective on professionals' perceptions, practices and experiences of learning. The use of the innovative eye-tracking methodology and the mixed-method approach in different contributions illustrates diverse methodological pathways to capture professional learning. In this symposium we aim to present a rich overall coverage of the topic with scientific relevance by complementing the existing frameworks. The insights provide perspectives to support professional competency development within and across the medical education curriculum. In the discussion of the symposium, E. Boshuizen will reflect on the empirical work and implications and possible future challenges for research and practice will be critically considered.

Learning visual practices in radiology

Conversation/ Discourse analysis,Ethnography,Social interaction,Workplace learning,Communities of practice,Learning in context

Andreas Gegenfurtner, Maastricht University, Netherlands; Roger Saljo, Goteborg University, Sweden; Erno Lehtinen, University of Turku, Finland;

Goodwinís notion of professional vision suggests that seeing in a particular domain can be understood as being accountable to a set of specific professional practices that are developed and lived within the community of this domain. Learning to see thus includes learning these visual practices. We define visual practices as acts of meaning making that are considered relevant for the discourse in a particular community of professionals. This study presents a case in radiology, in which an expert and two newcomers interact with each other and with chest radiographs while producing diagnoses. Taking an analytical perspective informed by a sociocultural perspective

and founded on conversation analysis and ethnomethodology, transcripts of the video recordings illustrate three visual practices the expert uses to help the newcomers see what there is to see; these practices are highlighting, rotating, and zooming. The analyses indicate that learning to see professionally cannot only be described as the processing of information in a cognitive system. Rather, learning to see can also be described as the developing of a skill repertoire needed for interacting with the semiotic resources in a focal domain.

The impact of a formal training on diagnosing medical images

Experimental studies,Mixed-method research,Student learning,Learning in context

Helen Jossberger, University of Regensburg, Germany; Julian Eder, University of Regensburg, Germany; Hans Gruber, University of Regenburg, Germany; Christian Stroszczynski, University Hospital Regenburg, Germany; Rene Muller-Wille, Univeristy Hospital Regensburg, Germany; Els Boshuizen, Open University, Netherlands;

Medical students have to develop knowledge and skills during their studies for their future professional practice, but we still know little about how the perceptual and cognitive system develops and how the learning process can be improved in formal learning settings. A study is presented in which the gaze patterns and diagnostic skills of medical students before and after a formal training in radiology were analysed to explore how they transform their knowledge. 34 medical students in the clinical phase participated. The subjects had to study 30 authentic x-ray images and decide whether a pathological finding was present and if so which one. Eye-tracking technology was used to analyse subjectsí visual information processes. The following parameters were measured: duration of fixations, dwell time in relevant areas, time until first fixation in relevant area, hit rate, duration of inspection of images. In addition, qualitative data on diagnostic accuracy was collected and students had to indicate their confidence. Results show differences in pre- and post-test. In the post-test, students were more confident in their decision making and their diagnostic performance improved. Confidence and performance correlated significantly. No differences were found regarding time of inspection. The eye movements did not change significantly after training. Although the formal training has improved studentsí performance, there is much room for improvement. Diagnosing medical images receives only little attention during medical education. In professional practice they continue to develop their skills further, but in the workplace formal training is more and more replaced by informal learning.

Learning diagnostic reasoning: Perceptions of trainees and supervisors in general practice

Content analysis,Qualitative methods,Workplace learning,Learning in context

Margje W.J. van de Wiel, Maastricht University, Faculty of Psychology and Neuroscience, Netherlands; Christian Mengelers, Maastricht University, Netherlands; Marjan Govaerts, Maastricht University, Netherlands; Erik Stolper, Maastricht University, Netherlands;

In the professional training of general practitioners, trainees work largely independently in diagnosing and treating patients. They mostly see patients alone and consult with their supervisors on a regular basis to discuss patients and problems, receive feedback, and improve

on their diagnostic competence. Both the quality of care and the quality of training, thus, depend on the interactions between a supervisor and a trainee regarding diagnostic reasoning. In the present interview study, we examined how twelve experienced supervisors and their trainees perceived diagnostic reasoning and its learning process in general practice. We particularly focused on feedback processes and the role of gut feelings. In line with research on workplace learning of residents and physicians, trainees thought that seeing patients and discussing cases with their supervisors were most valuable to learn diagnostic reasoning. Feelings of uncertainty and a sense of alarm were main reasons to discuss a case and ask for feedback and advice. The most valued supervisor role was to think along and ask questions to clarify traineesí reasoning process. However, diagnostic reasoning was often not explicitly discussed. Both groups thought the process itself deserves more weight. Individual differences in approaches were substantial and if reflected upon they may learn from each other. The study adds to our understanding of learning in medicine, and clearly showed that feedback processes were triggered by uncertainty and gut feelings. Interviewing both trainees and supervisors allowed us to compare their perceptions on learning diagnostic reasoning and to address these in their training.

Learning beyond graduation: Exploring newly qualified specialistsí professional learning

Mixed-method research,Informal learning,Workplace learning,Learning in context

Katrien Cuyvers, University of Antwerp, Belgium; Piet Van den Bossche, University of Antwerp, Belgium; Vincent Donche, University of Antwerp, Belgium;

Research on learning in the initial entrance into practice of licensed specialist physicians has received very little attention. This study outlines the results of an exploratory research on the nature of informal learning in the context of daily practice of newly qualified medical specialists. More specifically learning experiences, learning activities and patterns in learning activities are described. Eleven newly qualified physicians from different specialties in medicine participated in a main in depth interview study. Qualitative data-analysis was followed by cluster-analysis on quantified qualitative data. Results demonstrate that informal learning at the workplace is associated with four different learning experiences. More specifically analysis showed that newly qualified medical specialists describe learning mainly when performing their core job occupation, diagnosing and treating patients, while other related occupations are mentioned less. Across learning experiences, participants described to perform a variety of learning activities, categorized in doing, interacting, consulting written sources, observing and recognising uncertainty. Co-occurrence of learning activities were found within categories of learning activities as well as sequences across multiple categories of learning activities. Cluster-analysis revealed 3 diverse patterns showing consistent co-occurrencies of learning activities across learning experiences. The results contribute to present insights on informal professional learning in general and on informal learning for this specific population and context, in particular. Insights enable undertaking meaningful measures to guide physiciansí informal learning within context of the workplace. At the same time understandings offer opportunities to support medical students in developing self-regulating skills in preparation of lifelong professional development.

25 August 2015 11:00 - 12:30

Room Green_A6

Symposium

Learning disabilities and special education

Cognitive and academic skill interventions and support for low performing students

Keywords: Cognitive skills,Learning and developmental difficulties,Numeracy,Qualitative methods,Quantitative methods,Special education

Sig's: SIG 15 - Special Educational Needs

Chairperson: Riikka Mononen, University of Helsinki, Finland

Organiser: Pirjo Aunio, University of Helsinki, Finland

Discussant: Ulf Traff, Linkoping University, Sweden

In last years the number of studies about what interventions are effective for increasing the achievement in low performing students has increased substantially. The evidence on effects of cognitively focused interventions is contradictory (Kearns & Fuchs, 2013; Melby-Lerv?g & Fuchs 2013) as well are the intervention effects on for instance mathematical skills (Mononen & Aunio, 2013; Slavin & Lake 2008). The main aim of this symposium is to understand the effects of cognitively and academic skills focused interventions on achievement of low performing students. We also investigate how the students with learning disabilities experience the support they have received. Accordingly we are able to combine research traditions aiming to improve the learning of students having low academic performance. T?rm?nen et al. paper presents the positive effects of cognitive and language skills interventions done with Swiss 3rd and 4th graders with and without learning difficulties. Passolunghi et al paper reports positive effects of cognitive and mathematics skills intervention programs with average performing Italian kindergarteners. Hotulainen et al. investigated the effects of thinking skills intervention on low performing Finnish kindergarteners and found promising results. Desoete et al. studied what factors contributed to the psycho-educational development of children with mathematical learning disorders and revealed for instance that with well-designed educational methods it was possible to prevent the math anxiety. This symposium allows a discussion about evidence on efficient educational elements in supporting the learning of low performing students.

Cognitive Interventions in Swiss Schools - Transfer effects and multidisciplinary perspectives

Quantitative methods,Special education,Cognitive skills,Learning and developmental difficulties,Language (L1/Standard Language),Primary education

Pirjo Aunio, University of Helsinki, Finland; Barbara Studer-Luthi, University of Bern, Switzerland; Katja Margelisch, University of Bern, Switzerland; Sarah Mendelowitsch, University of Bern, Switzerland; Doris Eckstein, University of Bern, Switzerland; Walter J. Perrig, University of Bern, Switzerland; Minna Tormanen, University of Helsinki, Finland;

Aims: This study investigated the intervention effects and compared different outcomes of three trainings of cognitive core functions in children with and without learning difficulties. Participants: Pupils (N=132) from 3rd and 4th grades (mean age 10 yrs 2 months) from five regular elementary schools from Kanton Berne, Switzerland. Part of the participants had learning difficulties (n=43), like dyslexia, mathematics difficulties, motor and attentional problems and difficulties in language development. Design: This study used pre-test-intervention-post-tests-delayed post-tests design. As measurements wide test batteries were used consisting tests of literacy skills, scholastic abilities, executive functions, and fluid and crystallized intelligence; also questionnaires from teachers and parents were used. Intervention period was short and intensive: 8 weeks, 3 sessions/week, 15min/session. The interventions were conducted as individual interventions, however in whole class and small group settings. Interventions: Three different cognitive interventions were used: working memory (BrainTwister) and auditory-visual matching (Audilex) trainings. Implicit orthographic training (ImplOrth), which was used as active control group training, was a traditional paper-pen intervention differently from two computerized ones. Results: Results speak for positive intervention effects. Working memory training was effective especially in literacy and mathematical skills. Auditory-visual matching intervention had effects on literacy skills. Both trainings affected in positive way in tests measuring general intelligence. Concerning pupils having learning difficulties they were significantly benefiting from interventions; achievements were found in executive functions and in academic skills like literacy and mathematical skills. Keywords: cognitive interventions, working memory, auditory-visual matching, learning disabilities, implicit orthographic concept learning task, transfer effects

Comparison of working memory and early numeracy training

Quantitative methods,Cognitive development,Cognitive skills,Numeracy,Primary education

Hiwet Mariam Costa, University of Trieste, Italy; Maria Chiara Passolunghi, University of Trieste, Italy;

This study investigated the relationship between domain-general and domain-specific precursors of mathematical learning. It is aimed to verify and compare the effects of two types of training on early numerical skills. One training focused on the enhancement of a domain-general precursor, the working memory, while the other focused on the enhancement of a domain-specific precursor, the early numeracy. The participants were 48 preschool children, aged 5 to 6 years. Both the working memory and early numeracy training programs were implemented for 5 weeks. The results showed that the early numeracy intervention specifically affected early numeracy abilities in preschool children, whereas working memory intervention improved not only working memory abilities but also early numeracy abilities. These findings stress the importance of performing activities designed to train domain-general and domain-specific

precursors of mathematical learning encouraging an early prevention of learning difficulties during preschool years.

Thinking skills intervention for the low-performing Finnish kindergartners

Quantitative methods,Special education,Cognitive skills,Numeracy,Primary education

Risto Hotulainen, University of Helsinki, Finland; Pirjo Aunio, University of Helsinki, Finland; Riikka Mononen, University of Helsinki, Finland;

This paper reports results of the thinking skills intervention study on the low-performing Finnish 6-year-old kindergartners. The aim of the study was to examine the effectiveness of the thinking skills intervention program on the inductive reasoning (IR), analogical reasoning, mathematical and language skills, (i.e., knowledge of basic concepts, skills to identify the initial phoneme of the word). Sample of the study consisted of 42 children located in four different kindergartens. Participants for the intervention group (LowI) (n = 12) were selected on the basis of their low scores in the IR measure. Four children were selected to be in Low Control (LowC) group according to their almost as low performance as in LowI group in IR measure. The remaining 26 children formed a High Control group (HighC). We used quasi-experimental approach with pre-, post- and delayed post-test with intervention and control groups. In autumn 2013 children of the intervention group took part to the 12 training sessions (a 45 min) designed to promote general thinking skills and inductive reasoning. Results showed that the intervention group had greater gains in inductive reasoning and analogical reasoning than LowC group in delayed post-test. There were no other intervention effects. In conclusion, this study shows that thinking skills intervention program can have a significant delayed effect on childrenís inductive and analogical reasoning skills.

What supports the development in MLD. Children with MLDís perspectives in the forefront

Mixed-method research,Special education,Developmental processes,Learning and developmental difficulties,Numeracy,Primary education

Annemie Desoete, Ghent University & Artevelde University College, Belgium;

Starting from the finding that ëwhat researchers find is largely determined by what they choose to measureí and that the results of many of the quantitative studies are strongly influenced by the selected tests and questionnaires, three studies were set up. By getting at the inner experience of the children, we wanted to discover (in study 1, 2 and 3) rather than only to test (in study 3) what contributed to the development of children with mathematical learning disorders (MLD). In a first cross-sectional study 15 children with MLD and their parents were interviewed on their evaluation of support of MLD. In a second study the implicit knowledge of 40 experienced teachers and therapists was collected in a focusgroup and in 20 individual interviews to uncover/discover aspects that might otherwise have been hidden using quantitative methods. Finally, in a third study a longitudinal design was used in which 50 children with MLD and 50 peers without MLD were tested on reading, spelling and mathematics in elementary school and

retested on mathematics three years later to get an out-come based evaluation of math proficiency and quality of life. In addition an interview was used to gain a more substantive understanding of how children with MLD were uniquely affected and on what supported their development. Our results revealed a relationship between child factors on the one hand and instruction on the other hand on mathematical abilities, self esteem, acceptance and (growth) mind-set as outcome variables.

A 24

25 August 2015 11:00 - 12:30

Room Green_A8

Symposium

Research methodology

Methodological and Analytical Issues in the use of Multi-Modal SRL Data

Keywords: Cognitive skills,Emotion and cognition,Learning in context

Sig's: SIG 16 - Metacognition

Chairperson: Roger Azevedo, North Carolina State University, United States

Organiser: Sanna Jarvela, University of Oulu, Finland

Organiser: Roger Azevedo, North Carolina State University, United States

Discussant: Susanne Narciss, Technische Universitat Dresden, Germany

Contemporary research on self-regulated learning (SRL) focuses on the collection and analysis of complex, temporally-unfolding data using various interdisciplinary methods. Researchers are using various multi-modal SRL data, from log-files, eye-tracking, physiological sensors, facial expressions of emotions, dialogue moves, etc. in various contexts to examine the role of cognitive, metacognitive, affective, and motivational processes deployed both by individuals alone and between individuals. These methods and techniques challenge current conceptions of SRL while simultaneously addressing emerging conceptualizations, such as socially shared regulated learning. The use of these methods yields rich, contextualized, multi-modal data (e.g., video streams of facial expressions of emotions, text files from log-files, etc.) of temporally unfolding SRL processes, which challenge methodological approaches and traditional statistical analyses (e.g., violate statistical assumptions, unit of analyses, sampling rate, level of granularity, and temporal alignment). These challenges pose significant problems to the advancement of research in the area of SRL. The goal of this symposium is to present research on the methodological and analytical issues related to using multi-modal SRL data. The researchers presenting at this symposium will present and articulate how their multi-modal SRL data (based

on their respective theories and/or models of SRL, and conceptualizations of the underlying nature of SRL processes) and provide evidence about the complex nature of SRL processes deployed by learners in different contexts. In addition, they will illustrate how they have analyzed their data using a multitude of analytical methods (e.g., data mining) and describe their findings and their impact in the advancement of the field.

Contextualizing time and order ñ Our progress in (S)SRL research data collection

Mixed-method research,Cognitive skills,Self-regulation,Social aspects of learning,Higher education,Learning in context

Sanna Jarvela, University of Oulu, Finland; Jonna Malmberg, University of Oulu, Finland; Hanna Jarvenoja, University of Oulu, Finland;

In SRL research there is ongoing progress in theoretical and conceptual developments, mostly considering regulation of learning not only individual, but also as social and contextual process. Another advancement to progress research on SRL is increasing use of technology for supporting learning and interaction processes, as well data collection. Computer environments provide a new source of data for tracing learning processes and new data-driven analytical techniques are available. The aim of this paper is to review our progress in (S)SRL research data collection methods. In our research we have been working for empirical studies in real-life learning situations to trace regulated learning in collaborative groups. In our methodological development we have had four waves of progress: a) to understand the sequential and contextual aspects of regulated learning, b) to focus on the individual and group level shared regulatory activities with the help of regulation tools data, c) characterize temporality of (S)SRL progress with multichannel data and, d) identify objective and subjective markers of success in S(SRL). The main principles of the methodological approaches and accompanying examples will be presented.

Issues capturing, analyzing, infering self-regulatory processes from multi-channel data

Mixed-method research,Educational technology,Metacognition,Self-regulation,Technology,Higher education

Roger Azevedo, North Carolina State University, United States; Nicholas Mudrick, North Carolina State University, United States; Michelle Taub, North Carolina State University, United States; Seth Martin, North Carolina State University, United States; Jesse Farnsworth, North Carolina State University, United States; Federico Scholcover, North Carolina State University, United States; Laura Matalenas, North Carolina State University, United States; Christopher Williams, North Carolina State University, United States;

Understanding the complex nature of cognitive, affective, metacognitive, and motivational (CAMM) processes during learning with multi-agent learning environments is key to understanding how these processes impact learning about conceptually challenging topics (Azevedo et al., 2013). Current methodological and analytical approaches to studying SRL processes (e.g., self-reports) have several weaknesses as opposed to capturing real-time

deployment of SRL processes (see Azevedo & Aleven, 2013; Molenaar & Jarvela, 2014). As such, our approach has been to use MetaTutor (an intelligent, hypermedia multi-agent system) to collect rich trace data of CAMM processes during learning. In this paper, we focus on the challenges in capturing, analyzing, and inferring CAMM self-regulatory processes during human-artificial pedagogical agent interactions with MetaTutor. In our presentation we will present and discuss the methodological and analytical challenges associated with understanding and inferring the roles of CAMM processes by using examples from multi-channel, multi-modal data (e.g., log-files, eye-tracking, facial expressions of emotions, physiological data, and screen capture of learner-system interactions) collected from college students as they interacted with MetaTutor.

Challenges in capturing systematic changes in self-regulated learning

Case studies,Self-regulation,Technology,Learning in context

Lindsay McCardle, University of Victoria, Canada; Allyson Hadwin, University of Victoria, Canada;

The hallmark of self-regulated learning (SRL) is adaptation. From the perspective of Winne and Hadwinís (1998) model, adapting comes in two forms: (a) adapting perceptions of conditions, the cognitive operations they choose to engage, and the standards against which they evaluate performance to the task at hand (within COPES) and (b) making large-scale adaptations across tasks and study sessions (phase 4). Conceptualizations of SRL as an event have led to a shift in measurement to capturing learning as it unfolds and a focus on the first kind of adapting. However, what constitutes systematic changes in SRL remains unclear. If we treat SRL as event-based, how do we know when learners are adapting to a change in context and when learners are changing how they adapt? The purpose of this paper is to explore challenges in capturing and analyzing these large-scale, systematic changes in SRL using case studies of participants across a semester in a Learning Strategies course about SRL. Case studies combined quantitative and qualitative self-report data sources to create profiles of SRL for each participant at the beginning, middle, and end of the semester. Case studies are used to highlight three challenges to capturing systematic changes in SRL: (a) difficulties combining event-based ìsnapshotî of SRL into profiles; (b) confounding task and domain in these ìsnapshotsî; and (c) difficulties of being able to systematically collect and analyze event-based, quantitative data on intra-individual change in SRL for large groups of learners.

Relations between hypermedia learning, SRL process, and learning in 11-year-olds

Mixed-method research,Student learning,Self-regulation,Science education,Primary education,Multimedia learning

Cindy Klompmaker-Paans, Radboud University Nijmegen, Netherlands; Inge Molenaar, Radboud University Nijmegen, Netherlands; Eliane Segers, Behavioural Science Institute, Netherlands; Ludo Verhoeven, Radboud Universiteit Nijmegen, Netherlands;

Learning in primary schools increasingly takes place on the Internet. This poses great challenges for young children to self-regulate their learning. Children with high self-regulated learning (SRL) abilities use cognitive activities to study a topic and effectively control and monitor their learning with metacognitive activities and motivate themselves to an appropriate level of engagement. In order to provide effective support for young learners, a more precise understanding of how young learners use SRL during learning is needed. This study contributes to the existing literature by applying different online measures to capture the SRL process of children while they learn in a hypermedia environment. Moreover, the interplay between the SRL process, learner characteristics (motivation and SRL knowledge) and learning performance is assessed. The SRL process is captured by two different online measurements, namely learnersí think aloud and log files. Multiple data-stream analysis is applied to understand the relation between the two data-sources and the independent value of each to the data sources. For this purpose, sixty-two fifth-grade children participated in a hypermedia assignment (WebQuest) about the heart and living a healthy lifestyle. Preliminary results indicate that there are no correlations between studentsí SRL knowledge and learning performance. Process analysis of both the think aloud protocols and the log-files will be related to learner characteristics and learning performance.

A 25

25 August 2015 11:00 - 12:30

Room Brown_B4

Symposium

Problem solving and reasoning

Epistemic Practices of Dealing with Conflicting Information: Extending Current Theories

Keywords: Argumentation,Attitudes and beliefs,Problem solving,Reflective society,Science education

Sig's: SIG 16 - Metacognition

Chairperson: Sarit Barzilai, University of Haifa, Israel

Organiser: Dorothe Kienhues, University of Munster, Germany

Organiser: Sarit Barzilai, University of Haifa, Israel

Discussant: Michael Weinstock, Ben-Gurion University of the Negev, Israel

Information in the 21st century has become much more accessible yet simultaneously increasingly diverse, leading to the challenge of dealing with multiple information sources and

making sense of conflicting accounts. All contributions in this symposium focus on epistemic practices of reasoning with and about conflicting information. The four empirical studies included employ varied designs and complementary attempts. Contributors will reflect on how their work is challenging and extending theoretical frameworks of epistemic practices. The contributions: A) Expand the conceptualization of epistemic cognition by examining underresearched aspects such as epistemic criteria (RDC), epistemic metacognitive skills and experiences (BZ), and epistemic aims (KTB). B) Challenge current assumptions, for instance regarding the conceptualization of the source dimension (FB), domain-specificity (KTB), and the role of low quality sources in learning (RDC). C) Are attentive to different ways of interpreting information source properties (KTB, FB). D) Extend the understanding of epistemic cognition by situating it in relation to central constructs (motivation: FB; metacognition: BZ). Jointly, the studies attest the importance of understanding and fostering learners' and teachers' epistemic practices. Schraw will discuss further theoretical and educational implications of the contributions.

How people deal with conflicts in science: The role of subject area and personalization of science

Problem solving,Reasoning,Informal learning,Learning in context

Dorothe Kienhues, University of Munster, Germany; Lea Tichelbaecker, University of Muenster, Germany; Rainer Bromme, Universitat Munster, Germany;

Laypeople stumble across science-based information almost on a daily basis, for example when they read the newspaper. Thereby, laypeople likely come across conflicting information. In our study, we focused on two aspects of conflicting scientific information: the subject area in which the conflict occurs (psychology vs. chemistry), and how personalized the concurring statements are introduced, that is as personal interviews with scientists or as depersonalized summaries of studies. A newspaper article on the origin and function of tears was systematically varied regarding these aspects. In a 2x2 between-subjects study, high-school students (N = 225) were randomly assigned to one of the four experimental conditions and read the corresponding article. Dependent variables included to what extent participants perceive the information read as contradictory, how participants explain conflicting scientific claims (using the 4-factor instrument ECSC; Thomm et al.), the justification and certainty of knowledge, epistemic aims, and the perceived potency of science for solving the conflict. Results indicate the role of subject area, e.g. the article was perceived as more contradictory when contextualized as a chemistry topic in comparison to a psychology topic, but the potency of science for solving the conflict was perceived higher for chemistry than for psychology. Regarding the justification and certainty factor, psychological knowledge was perceived as less certain and more subjective than chemical knowledge. Furthermore, interactions between subject area and personalization were found for three of the ECSC scales. We will discuss implications and outline in how far under-researched aspects of epistemic cognition are considered.

Beliefs about sources of knowledge predict motivation for learning in teacher education

Pre-service teacher education,Teacher professional development,Attitudes and beliefs,Reasoning,Motivation and emotion

Leila Eve Ferguson, University of Oslo, Norway; Ivar Braten, University of Oslo, Norway;

Student teachers need to acquire knowledge about instruction and student learning, which may be gained from different sources. However, they are often said to express a preference for personal, experiential sources of knowledge over formalized and theoretical knowledge sources, which is discordant with traditional understandings of ìadvancedî beliefs about sources of knowledge from a personal epistemology viewpoint. We extended prior work on teachersí beliefs about sources of knowledge and investigated beliefs about knowledge sources (theoretical, practical/experiential, and social/ popular media) as contributors to motivation for learning in a sample of 96 Norwegian first-year student teachers. Results showed that participants believed more in practically-derived, experiential sources of knowledge than in theory-based, formalized sources of knowledge and in social and popular media knowledge sources, and that they appreciated practical learning tasks more than theoretical learning tasks. Moreover, beliefs about theory-based, formalized sources of knowledge predicted motivation to learn from theoretically oriented coursework and beliefs about practically-derived, experiential sources of knowledge predicted motivation to learn from teaching practice. Beliefs about social and popular media as sources of knowledge about instruction and student learning negatively predicted motivation to learn from theory as well as from practice. Possible implications for epistemic belief research and teacher education are discussed.

Untangling the cognitive and metacognitive facets of epistemic thinking about conflicting sources

Attitudes and beliefs,Metacognition,Problem solving,Reasoning,Learning in context

Sarit Barzilai, University of Haifa, Israel; Anat Zohar, Hebrew University, Israel;

Epistemic thinking has been found to include both cognitive and metacognitive aspects. Yet, few studies have examined the interplay of these facets while reading. The purpose of this study was to examine which cognitive and metacognitive facets of epistemic thinking learners spontaneously verbalize as they read conflicting information sources, to characterize these facets, and to explore their interrelations. The study also examined if learnersí epistemic metacognition is related to their non-epistemic metacognition. 60 university students thought aloud while reading conflicting information sources about a socio-scientific dilemma for the purpose of writing an argument. A coding scheme for identifying verbalizations of epistemic and non-epistemic cognition and metacognitive knowledge, skills, and experiences in think aloud protocols was developed and validated. About half of learnersí verbalizations while reading were found to entail epistemic issues. Epistemic thinking included similar proportions of cognitive and metacognitive processes. The most prevalent metacognitive epistemic process was epistemic monitoring. Spontaneous references to explicit epistemic metacognitive knowledge were less frequent and yet were found to be related to increased epistemic cognition. Epistemic metacognitive experiences were also identified and attested to the ìwarmî nature of epistemic metacognition. Lastly, relations were found between epistemic and non-epistemic metacognitive

experiences, suggesting that engagement in epistemic metacognition may be related to learnersí general metacognitive tendencies. The results thus provide further evidence that multiple cognitive and metacognitive aspects of epistemic thinking need to be taken into consideration in order to account for how learners deal with controversies.

Bad evidence makes for good learning: An analysis of science studentsí argumentation

School effectiveness,Student learning,Argumentation,Attitudes and beliefs

Ronald Rinehart, Rutgers University Graduate School of Education, United States; Ravit Golan Duncan, Rutgers University , United States; Clark Chinn, Rutgers University, United States;

Science classrooms tend to be epistemically sterile environments (cf. Goldberg, 2013) focused on unproblematic accounts of science. It is rare for students to confront dilemmas about who and what to believe and why it should be believed. Participation in epistemically sterile classrooms is unlikely to prepare students for the outside world which is filled with quack medicine and supernatural claims. We describe the results of a classroom based intervention with middle school science students (ages 12-13) designed to scaffold studentsí epistemic cognition through attention to model criteria, evidence ratings, and criteria for writing good arguments in the face of competing claims and conflicting evidence of variable quality. Studentsí (n=87) essays were coded for several epistemic practices including argumentation quality, evidence quality evaluation, and evidence-to-model coordination. Prior research (Berland & McNeill, 2010) has shown that eliciting counterarguments is difficult and many studentsí written arguments lack deep structure. Our results show that rich student justifications are stimulated by low-quality evidence. These justifications often invoke assessments of the details of the evidence like methodological quality, sample size, and the evidenceís relevance to both of the scientific models. As a result studentsí arguments tend to contain justifications in favor of the model they think is best supported by the good evidence as well as counterarguments against the alternate model and its associated lower quality evidence. We extend current research on student argumentation by showing that instructional design decisions to include lower quality evidence and the presence of competing models facilitates deeper argumentation practices.

A 26

25 August 2015 11:00 - 12:30

Room Blue2_D1

Symposium

Motivation

Studentsí engagement in learning and technology: A research partnership for supporting learning.

Keywords: Assessment methods and tools,Educational technology,Emotion and affect,Motivation and emotion

Sig's: SIG 8 - Motivation and Emotion

Chairperson: Maria Solomou, Cyprus University of Technology, Cyprus

Organiser: Andrew Martin, University of New South Wales, Australia

Organiser: Michael Filsecker, University of Duisburg-Essen, Germany

Discussant: Michael Filsecker, University of Duisburg-Essen, Germany

It has been recognized that the quality of students' engagement in learning can help explain important academic outcomes such as academic achievement, attitudes, and emotional well-being, among others. Alongside the growing interest and evidence in the area of engagement, the role of technology has also become a major research focus in learning environments. The proposed symposium brings together these two major research strands with a view to exploring the role technology can play in helping us understand the nature of students' engagement in different settings and the challenges to support it. Participants will each contribute a paper describing their current research on engagement addressing at least two of the following issues: a) their working definitions of learning engagement and their theoretical framework, b) their research questions and the context of their research, c) their methods for capturing learning engagement using technology, d) how technology may enhance students' engagement in learning, and e) new directions in research on student engagement in learning as relevant to technology. The presenters represent diverse theoretical perspectives that are also reflected in the research methods they use to study students' engagement in learning. Contributions (including the Discussant's) will focus on diverse ways of using technology to capture engagement in different contexts and also explore how engagement in learning can be optimized through the use of technology.

Engagement, motivation, and buoyancy at school: Mobile technology capturing real-time data

Quantitative methods,Assessment methods and tools,Educational technology,Motivation and emotion

Andrew Martin, University of New South Wales, Australia;

The present study collects intensive real-time longitudinal data, with three data collections per day, every school day, across four school weeks. Using mobile technology (e.g., PDAs, smart phones, laptops, tablets) to capture intensive intra-individual real-time data, a four-level model was explored, consisting of within-day ratings at the first level (3 ratings per day), between-day ratings at the second level (5 days per week), between-week ratings at the third level (4 weeks), and between-student ratings at the fourth level (60 possible time points per student). Multilevel modeling showed substantial within-day (intra-individual) variability in engagement, motivation

and buoyancy (M = 23%) and substantial between-student variability (M = 67%). There was not so much variability between days (M = 3%) ñ and not so much between weeks (M = 6%). We propose the study offers insights for engagement, motivation and buoyancy theorizing (particularly around stability and developmental issues) and technological and logistic guidance for collecting real-time data.

Within-student variability in learning experiences, and teachersí perceptions of engagement

Quantitative methods,Assessment methods and tools,Emotion and affect,Motivation and emotion

Lars-Erik Malmberg, University of Oxford, United Kingdom;

In our ecological momentary assessment study, we investigated how trait and intraindividual variability dimensions of studentsí engagement and motivation were related to teacher-rated student task-focus and academic performance. 314 primary school studentsí (Years 5 and 6) completed the Learning Experience Questionnaire (LEQ; assessing engagement by way of task focus, effort exertion, and help-seeking; and motivation by way of perceived competence, perceived task difficulty, and intrinsic motivation) in Personal Digital Assistants (PDAs), on average 11.2 learning episodes (SD = 4.8; Range = 1-29; nepisodes = 3,532), linked with teacher-reports. We calculated mean squared sequential differences (MSSD) for each indicator and modeled state, trait and intraindividual variability constructs using structural equation models (MSEM). In general, intrapersonal variability was moderately associated with task-focus (from r = -.08 to r = -.28), and with academic performance (from r = -.14 to r = -.37). Higher teacher-rated task focus predicted: higher trait intrinsic motivation, task difficulty, effort exertion, and competence evaluation; and, more variability in task difficulty and effort exertion. Higher academic performance predicted: lower trait intrinsic motivation, help-seeking and higher competence evaluation; and less variability in extrinsic motivation, task difficulty, effort exertion, help-seeking and competence beliefs. Overall the use of user-friendly technology for data-collection and state-or-the-art quantitative models provides an important window into the studentsí learning experiences. We discuss how such technology and data-collection techniques could be integrated in everyday teaching.

Educational robotics: Technology to promote pre-service teachersí STEM engagement

Qualitative methods,Quantitative methods,Assessment methods and tools,Educational technology,Motivation and emotion

ChanMin Kim, University of Georgia, United States;

In this presentation, we report a research project aiming to help teachers learn how to design and implement Science, Technology, Engineering, and Mathematics (STEM) lessons using robotics. Specifically, preservice teachersí STEM engagement, learning, and teaching via robotics were investigated in a teacher education course for future elementary school teachers. Both quantitative and qualitative data were collected from surveys, classroom observations, and interviews. Data analysis results show positive changes overall in preservice teachersí STEM

engagement, learning, and teaching. Findings are discussed in terms of robotics as a technology that can enhance learner engagement. Future research and teacher education directions are also presented.

The value of focusing on productive forms of disciplinary engagement

Design based research,Quantitative methods,Assessment methods and tools,Educational technology,Motivation and emotion

Daniel Hickey, Indiana University, United States;

This presentation argues that efforts to study and improve engagement in both informal and formal contexts should focus on productive disciplinary engagement (ìPDEî). Engagement is presumed to be disciplinary when contributions are coordinated and on-task, and concern the specific languages and practices associated with recognizable ìbig Dî Discourse communities. Disciplinary engagement is presumed to be productive when it raises new relevant questions, clarifies confusion, makes connections, and become more sophisticated. This presentation argues that PDE ideal for (a) understanding and improving actual learning contexts, (b) doing so in ì21st Centuryî networked learning contexts, (c) preparing teachers to succeed in such contexts, (d) conducting design-based educational research that yields useful evidence-based principles, and (e) increasing coherence to the educational research in general and the study of engagement in particular. Examples will be presented of design-based research that directly fostered PDE in order to indirectly foster disciplinary understanding and achievement. These examples involved educational videogames, conventional online college courses, open online college courses, and ongoing efforts to transform a fully-online university-run high school.

A 27

25 August 2015 11:00 - 12:30

Room Purple_H3 (Rialto)

Special session

Assessment methods and tools

EARLI 30: Reflections by Former EARLI Officers

Keywords: Case studies,Instructional design,Integrated learning

Sig's: SIG 1 - Assessment and Evaluation

Chairperson: Erik De Corte, University of Leuven, Belgium

Organiser: Erik De Corte, University of Leuven, Belgium

Discussant: Erik De Corte, University of Leuven, Belgium

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EARLI 30: Reflections by former EARLI officers

Mixed-method research,Quantitative methods,Assessment methods and tools,Educational policy,Lifelong learning

Heinz Mandl, Ludwig-Maximilians-Universitat (LMU), Germany;

EARLI was founded during a conference held in Leuven, Belgium in June 1985 with the aim to support and promote an active research culture in the field of learning and instruction. The first conference was attended by 135 junior as well as senior European scholars and 5 well-known American researchers (among them the then President of AERA, David Berliner). The conference was organized around the following six themes that were topical at the time: developmental processes; cognitive-motivational interactions; problem solving; instructional and social interactions; discourse processing; and individual differences. The founding of the association was enthusiastically supported by all the participants in the first conference. Apparently the Zeitgeist was ripe for the establishment of such an association for research on learning and instruction in Europe. Indeed, after the launch in 1985 the organization has quickly and steadily grown over the past three decades. The number of presentations and participants in the biennial conferences increased continually, and linked up with it also the membership of EARLI. After the EARLI 2013 conference in Munich, EARLI had 2805 members of which 2026 were full members and 779 were JURE (Junior educational Researchers) members. The members originate from 56 countries, and considered by country the USA ranks fourth in terms of number of members. An important decision was taken in 1995, namely the establishment of JURE, a network of Junior educational Researchers, aimed at stimulating the professional development of young scholars: master and PhD students, as well as graduates who have received their doctorate within the last two years. In close cooperation with EARLI, the JURE members organize yearly scientific events. The past 15 biennial EARLI conferences have always been appreciated for their high quality. But in addition to the conferences EARLI has launched over the years 3 journals: Learning and Instruction (1991), Educational Research Review (2006), and Frontline Learning Research (2013), and is affiliated to the journal Learning, Culture and Social Interaction (2012). Furthermore EARLI publishes an international multidisciplinary book series New Perspectives on Learning and Instruction (8 volumes). Since 2008 the association also organizes and funds EARLI Advanced Study Colloquia. An ASC is a five-day meeting of a small group of EARLI members who gather for an in-depth discussion of research in a specific domain of learning and instruction. Since its foundation in 1985 EARLI has thus constantly grown quantitatively, and has developed several high quality products, esp. its conference and journals. As a result the association has become recognized as the most important educational research association in Europe that offers a platform for discussion and dialogue among scholars from all over the world about research on learning and instruction, and as such promotes international and interdisciplinary cooperation in this field of inquiry. Taking all this into account the International Program Committee of this yearsí conference has considered the 30th birthday of EARLI as a good occasion for organizing a ìlook back and look forwardî reflection session involving a number of members of the association who have acted in the past as ìEARLI officersî in different positions, namely EARLI President, Journal Editor or Conference President. Each of them are asked to address the following questions: ï What are in your opinion major changes in the field of Learning and Instruction (L&I) over the past 30 year? ï In which respects has EARLI had an impact on your work in the field of L&I? ï Has research in L&I had impact on

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EARLI 30: Reflections by former EARLI officers

Mixed-method research,Quantitative methods,Educational policy,Communities of learners

Filip Dochy, KU Leuven, Belgium;

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Mixed-method research,Quantitative methods,Assessment methods and tools,Educational policy,Lifelong learning

Roger Saljo, Goteborg University, Sweden;

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Mixed-method research,Quantitative methods,Educational policy,Lifelong learning

Lucia Mason, University of Padova, Italy;

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Andreas Demetriou, University of Nicosia, Cyprus;

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A 28

25 August 2015 11:00 - 12:30

Room Brown_B7

Special session

Assessment methods and tools

Meet the EARLI Journal's Editors

Keywords: Achievement,Action research,Argumentation

Sig's: SIG 1 - Assessment and Evaluation

Chairperson: Dimitris Pnevmatikos, University of Western Macedonia, Greece

Organiser: Dimitris Pnevmatikos, University of Western Macedonia, Greece

EARLI publishes three peer-referred journals which are all available for free readership to all members; Learning and Instruction, Educational Research Review and the newest open access journal Frontline Learning Research. Additionally, the EARLI book series, New Perspectives on Learning and Instruction is designed to communicate the high quality research on learning and instruction to a broader audience of researchers and post-graduate students in education and psychology. Earli members are fully encouraged to submit their current research on the association's journals. The Meet the EARLI Journals' Editors symposium aims to inform the EARLI members for the journals that the association publishes and they are in the members' service. Additionally, the editors will inform the audience for the specific aims of each journal,

how to select the right journal to publish their research and they will betray some of the secrets for a successful submission to the journals.

Learning and Instruction

Action research,Case studies,Comparative studies,Content analysis

Jan Vermunt, University of Cambridge, United Kingdom;

As an international, multi-disciplinary, peer-refereed journal, Learning and Instruction provides a platform for the publication of the most advanced scientific research in the areas of learning, development, instruction and teaching. The journal welcomes original empirical investigations. The papers may represent a variety of theoretical perspectives and different methodological approaches. They may refer to any age level, from infants to adults and to a diversity of learning and instructional settings, from laboratory experiments to field studies. The major criteria in the review and the selection process concern the significance of the contribution to the area of learning and instruction. This is an audience-initiated session and participants are invited to raise any question or issue they feel pertinent.

Educational Research Review

Action research,Case studies,Comparative studies,Content analysis

David Gijbels, University of Antwerp, Belgium;

Educational Research Review is an international peer-refereed journal aimed at researchers and various agencies interested to review studies in education and instruction at any level. The journal welcomes different types of systematic review-studies, theoretical contributions and shorter forum-papers but does not publish original empirical investigations.

Frontline Learning Research

Action research,Case studies,Comparative studies,Content analysis

Erno Lehtinen, University of Turku, Finland;

Earli decided to found a new journal in order to open more publishing opportunities for high level manuscripts. The particular aim was to explore open access publishing and emphasize innovative and risk-taking research in the field of learning and instruction. Frontline Learning Research (FLR) is an open-access electronic-only journal that publishes articles on issues and trends occurring internationally in research on learning and educational sciences. FLR is a forum for multidisciplinary research on learning and learning environments and it aims at enhancing new theoretical and methodological approaches in learning sciences. FLR also welcomes commentaries aimed at triggering discussion about important theoretical and methodological questions about the published articles. In the Conference we will discuss more deeply about the

guiding principles of FLR and help participants to recognize what features make manuscripts innovative and risk-taking.

Becoming a guest editor of a book in the EARLI Book Series

Action research,Case studies,Comparative studies,Content analysis

Mien Segers, Maastricht University, Netherlands; Isabel Raemdonck, Universite Catholique de Louvain, Belgium;

The aim of the Earli series, New Perspectives on Learning and Instruction, is to present, to the scholarly community, high quality, theoretically-driven research in the areas of learning and instruction. Books that are published in the series are innovative, attempting to forge new conceptions of the field. Originality, scientific merit, and significance for the field are what guide the series. Both edited collections and sole-authored texts that meet these criteria are considered for publication. The focus is on European work, however, contributions from non-European researchers and non-members of the European Association for Research in Learning and Instruction are invited. The series is designed to appeal to a wide audience of researchers and post-graduate students in education and psychology. Latest book: Learning Patterns in Higher Education, Dimensions and research perspectives. Edited by David Gijbels, Vincent Donche, John T. E. Richardson, Jan D. Vermunt.

B 1

25 August 2015 13:45 - 15:15

Room Purple_H3 (Rialto)

Paper Presentation

Attitudes and beliefs

Attitudes and beliefs

Keywords: Content analysis,Qualitative methods,Teacher professional development,Attitudes and beliefs,Action research,Case studies,Design based research,Comparative studies,Reflective society,Citizenship education,Workplace learning,Learning in context,Cultural psychology,Emotion and cognition,Social interaction,Secondary education

Sig's: SIG 11 - Teaching and Teacher Education,SIG 13 - Moral and Democratic Education,SIG 3 - Conceptual Change

Chairperson: Ellen Kok , Maastricht University, Netherlands

What kinds of resources do teachers rely on in their professional practice? An interview study

Content analysis,Qualitative methods,Teacher professional development,Attitudes and beliefs

Andreas Hetmanek, Ludwig-Maximilians-Universitat (LMU), Germany; Christof Wecker, Ludwig-Maximilians-Universitat (LMU), Germany; Jan Kiesewetter, Munich University Hospital, Germany; Kati Trempler, University of Wuppertal, Germany; Cornelia Grasel, University of Wuppertal, Germany; Martin R. MRGFischer, Munich University Hospital, Germany; Frank Fischer, Ludwig-Maximilians-Universitat (LMU), Germany;

Evidence-based practice is of growing interest in Education. Implementing evidence-based practice in teaching requires appropriate interfaces between research and practice. The extent to which teachers rely on educational research in their practical decisions is influenced by their subjective views of what constitutes potentially helpful resources for their everyday work. In this study, we investigated which kinds of resources, including products of educational research broadly conceived are regarded as potentially helpful, and for which contexts of application these resources are considered to be relevant. Semi-structured interviews were conducted with 25 teachers from three different types of school in three federal states of Germany. The interviews were transcribed and coded in order to identify the kinds of resources mentioned and their corresponding contexts of application. The teachers frequently indicated that they typically rely on teachersí materials, such as companion materials accompanying textbooks, but also on products of educational research. With respect to evidence-based practice, the combination of the resource type products of educational research and the context of application instructional design is particularly interesting, but such combinations occurred only very rarely in the interview material. More often products of educational research were linked to the context of application (suboptimal) learning prerequisites such as ADHS. Thus, products of educational research are certainly perceived as a resource of potential practical relevance, but from the perspective of evidence-based practice our findings hint towards some challenges.

Exploring video analysis as a tool for improving inclusive attitudes in pre-service support teachers

Action research,Case studies,Content analysis,Design based research

Fabio Dovigo, Bergamo University, Italy;

Support teachers are currently facing complex professional change process related to the shift from integration to inclusion in special education. As the number of children involved in support activities is rising, increasing attention has to be paid to the way training courses are helping future teachers to deal with this new scenario. Literature on this topic shows that pre-service teachersí attitudes and beliefs towards inclusive education play an important role in orienting their future action in classroom. In this regard, research emphasizes that future teachers generally agree about the principals of inclusive education, but tend to remain skeptical about the real possibility of translating them into educational practices. Beyond confirming the validity of that picture, the paper reports how the video-analysis of lessons simulated by future teachers and focused on inclusive didactics can promote positive change of their beliefs, especially through the development of a reflexive attitude more favorable to the implementation of inclusive principles into classroom practices.

Responsible teaching to improve adolescents' attitudes towards cheating

Comparative studies,Reflective society,Attitudes and beliefs,Citizenship education,Workplace learning,Learning in context

Catherine Dimitriadou, University of Western Macedonia, Greece; Dimitris Pnevmatikos, University of Western Macedonia, Greece; Vassiliki Papadopoulou, University of Western Macedonia, Greece;

Premised on the fact that studentsí resorting to cheating is due to a variety of individual and social factors, we pondered on what responsible teaching should consist of, in order to improve the adolescentsí attitudes towards cheating. To address this question, we conducted a comparative study aimed at identifying whether it is the same reasons that could deter early and late adolescents from cheating in school exams. Ninety early and late adolescents from Greece and Sweden participated in the study. Participants were involved in a scenario in actual classroom-based exam conditions, where they could potentially exhibit dishonest behaviour due to the teachersí absence from the class and the lack of supervision. Participants then were asked to denote on a 5-point Likert type scale their agreement with 17 statements-reasons that could discourage them from cheating. Results showed that the structure of the answers collected differed between the two national groups, disclosing that the latent reasons that are considered as good enough to persuade adolescents to avoid cheating vary greatly. For the Greeks adolescents, their teacherís image is considered as an important reason to avoid cheating, while for the Swedish adolescents the teacher is viewed either as part of the system, or as an adult who incarnates the social expectations. Moreover, the Swedish adolescents rated their statements higher than the Greeks, showing that for Greeks the reasons are more controversial or negotiable and less persuasive than they are for the Swedish adolescents. In other words, responsible teaching for improving adolescents' attitudes towards cheating is a culturally mediated phenomenon.

Aggression and cyberaggression: Normative beliefs among Israeli youth

Cultural psychology,Attitudes and beliefs,Emotion and cognition,Social interaction,Secondary education

Efrat Pieterse, Western Galilee College & The Open University of Israel, Israel; Yehuda Peled, Western Galilee Cl. , Israel; Mandy B. Medvin, Westminster College, United States; Linda P. Domanski, Westminster College, United States;

This research examined student views about cyberaggression among Israeli 5th-10th grades using a self-report, cross-sectional design. Results from 823 Jewish-Israeli and Arab-Israeli youth were analyzed on measures of normative beliefs about cyberaggression, face-to-face aggression and strategy responses to hypothetical cyber scenarios. Findings indicated that normative beliefs about cyberaggression were associated with traditional aggression, increased with grade, that males had higher normative beliefs than females, and that gender differences in cyberstrategies were supported. Normative beliefs predicted direct cyberaggressive strategies more clearly than indirect strategies, regardless of degree of electronic usage. Findings suggest

that such views can influence student choices of behaviors, but that methodologically we need a clearer understanding of the influence of beliefs on indirect strategies

B 2

25 August 2015 13:45 - 15:15

Room Green_A1

Paper Presentation

Cognitive development

Cognitive development

Keywords: Design based research,Instructional design,Cognitive skills,Reasoning,Physical Sciences,Higher education,Experimental studies,Student learning,Conceptual change,Science education,Primary education,Model-based reasoning,Cognitive development,Developmental processes

Sig's: SIG 3 - Conceptual Change,SIG 5 - Learning and Development in Early Childhood,SIG 6 - Instructional Design

Chairperson: Madeleine Bieg, University of Konstanz, Germany

Designing a systematic learning environment to develop studentsí critical thinking in physics

Design based research,Instructional design,Cognitive skills,Reasoning,Physical Sciences,Higher education

Dawit Tibebu Tiruneh, KU Leuven, Belgium; Mieke De Cock, KU Leuven, Belgium; Jan Elen, KU Leuven, Belgium;

Development of critical thinking (CT) is one of the major goals of higher education. However, there is little agreement on the instructional principles and procedures that are theoretically sound and empirically valid to optimize subject-matter area instruction for CT development. At present, the major challenge of research appears to be the systematic design of subject-matter instruction in a way that facilitates acquisition of CT skills. The purpose of this study was to test the hypotheses that a systematically designed subject-matter instruction, in the context of a freshman physics course, yields greater acquisition of domain-specific and domain-general CT skills than a regular subject-matter instruction. The study employed a pretest-posttest quasi-experimental design with two conditions: 45 students participated in the experimental and 44 students in the control condition. A learning environment was systematically designed according to the first principles of instruction model (Merrill, 2013). The experimental condition followed the designed learning environment, while the control condition followed the regular instruction,

which was typically not in line with the first principles. Compared to the control condition, the experimental condition students showed significantly greater gains on a domain-specific CT test, namely the CTEM. However, no significant difference was found on a domain-general CT test (i.e., the HCTA) between the students in the two conditions. The results also showed that greater performance on a domain-specific CT test explained a significant proportion of the variance on domain-general CT performance. The implications of the findings for instructional design are discussed, and suggestions for future research are given.

Theory of mind as a path towards science understanding: An educational intervention study

Experimental studies,Student learning,Conceptual change,Science education,Primary education,Model-based reasoning

Natassa Anastasia Kyriakopoulou, University of Athens, Greece; Stella Vosniadou, National and Kapodistrian University of Athens, Greece;

In the present research we report on the results of an intervention study which tested the hypotheses that 1) if we enhance childrenís theory of mind ability (ToM) we can foster epistemological understanding, and that 2) ToM understanding can be used in return to help children better understand counter-intuitive scientific explanations. Twenty fifth-graders received a seventeen-hour instruction during their school program. The results showed significant pre/post gains for the experimental group regarding childrenís theory of mind ability, epistemic stance, and science understanding. Moreover, Theory of Mind and Personal Epistemology appeared to be strong predictors for childrenís ability to take into account different conceptions of the same physical phenomena. The findings support the hypothesis that Theory of Mind can be used to build epistemological sophistication together with content knowledge in young children as a means of promoting Science Learning.

The development of symbolic and non-symbolic number line estimations: Three developmental accounts

Experimental studies,Cognitive development,Developmental processes,Primary education

Koen Luwel, KU Leuven, Belgium; Delphine Sasanguie, KU Leuven, Belgium; Bert Reynvoet, KU Leuven - Campus Kortrijk, Belgium; Lieven Verschaffel, KU Leuven, Belgium;

Three theoretical accounts have been put forward for explaining the development of childrenís number line estimation patterns: the logarithmic-to-linear representational shift (e.g., Siegler& Opfer, 2003), the two-linear-to-linear transformation (e.g., Ebersbach et al. 2008) and the proportion judgment account (e.g., Barth & Paladino, 2011). Although several studies tried to determine which of these accounts explains the development of childrenís estimation patterns best, the results they yielded are inconclusive. Moreover, none of them has ever compared the three accounts at once. The present study tried to resolve this issue by directly comparing these three accounts in a cross-sectional (Experiment 1) and a longitudinal design (Experiment 2). Furthermore, in both experiments we tested the extent to which children would exhibit a similar

developmental pattern on symbolic and non-symbolic number lines. Results of both experiments revealed that, in case of symbolic estimations, the proportion judgment account increasingly fitted the data better over development compared to the other two accounts, suggesting that an increase in the use and variety of benchmark-based strategies might explain this development, rather than a change in the underlying mental number representations. On the other hand, the development of non-symbolic estimations could not be explained by a single developmental account, suggesting that the sources of change in non-symbolic number line estimation might be different from these in symbolic number line estimation.

B 3

25 August 2015 13:45 - 15:15

Room Brown_B1

Paper Presentation

Comprehension of text and graphics

Comprehension of text and graphics

Keywords: Experimental studies,Instructional design,Comprehension of text and graphics,Reading comprehension,E-learning/ Online learning,Multimedia learning,Quantitative methods,Science education,Secondary education,Student learning,Social sciences,Informal learning,Knowledge creation,Cognitive development,Cognitive skills,Developmental processes

Sig's: SIG 2 - Comprehension of Text and Graphics

Chairperson: Erica de Vries, Universite Pierre-Mendes-France, France

Effects of disfluency and test expectancy on learning with multimedia

Experimental studies,Instructional design,Comprehension of text and graphics,Reading comprehension,E-learning/ Online learning,Multimedia learning

Alexander Eitel, Knowledge Media Research Center, Germany; Tim Kuhl, University of Mannheim, Germany;

The disfluency effect refers to the finding that making text slightly harder-to-read (i.e. disfluent) can trigger more effortful processing that, in turn, leads to superior learning outcomes. However, recent research challenges the generalizability of this effect and suggests taking a closer at the conditions under which disfluency is ñ or is not ñ desirable to learning. One such condition is knowledge whether a test will follow (i.e., test expectancy). Participants who are aware that a test will follow may already engage in effortful processing, so that making text harder-to-read (disfluent) might not change their processing mode any further. Thus, particularly when no test is expected, disfluency is supposed to exert its beneficial effect. This assumption was tested in a

2x2 design with text legibility (fluent vs. disfluent) and test expectancy (low vs. high) as factors, and learning times and learning outcomes (retention, transfer) as factors. Results revealed that whereas high test expectancy led to better learning outcomes (for retention and transfer) the harder-to-read (disfluent) text did not. Unlike expected, there was no interaction between the two factors. In addition, high test expectancy as well as disfluent text led to longer learning times, which in turn resulted in a lower learning efficiency for disfluent compared to fluent text. Hence, the present results further question the stability and generalizability of a positive disfluency effect on learning, because high test expectancy ñ but not disfluency - stimulated better learning through more effortful processing the way it was supposed to.

Decorated graphs: The effect of illustrations on comprehension and recall

Quantitative methods,Comprehension of text and graphics,Science education,Secondary education

Irit Aharon, University of Haifa, Israel; Billie Eilam, University of Haifa, Faculty of Education, Israel;

Decorated graphs are commonly used for communicating quantitative information in mass media and school textbooks. The present study explored the relations between different styles of decorated graphs and studentsí performance on tasks requiring the extraction of information and meaning from these graphs and recalling it a week later. Four groups of 8th graders participated in the study (total N=109 boys and girls). All groups received the same set of graphs comprising pie, bar and scatter graphs. One group (control) received plain graphs and three groups received decorated graphs designed in a unique decorative style: a) graphs placed on a background picture; b) graphs with a picture beside it; and c) graphs composed of illustrated indicators. Findings suggest a possible positive effect of decorative pictorial elements embedded in graphs on the retention of the presented information. These findings bear direct implications for the design of learning materials.

The contribution of comprehension to the evaluation and persuasive impact of argumentative text

Experimental studies,Student learning,Comprehension of text and graphics,Social sciences,Informal learning,Knowledge creation

Irene-Anna Diakidoy, University of Cyprus, Cyprus; Stelios Christodoulou, University of Cyprus, Cyprus; Kalypso Iordanou, University of Central Lancashire, Cyprus; George Floros, University of Cyprus, Cyprus; Philip Kargopoulos, Aristotle University of Thessaloniki, Greece;

Research has shown substantial belief change as a result of reading text and the pervasive influence of prior belief in the evaluation of short arguments. Both outcomes have been attributed to the depth to which the text or the argument has been processed. This study brings together critical thinking and text comprehension research by employing an extended argumentative text and varying the quality of its arguments. The study examines the contribution of comprehension outcomes to the critical evaluation and persuasive impact of argumentative

text. One-hundred and sixteen university students read one of two versions of a two-sided persuasive argumentative text varying in argument quality. Measures of initial topic-related beliefs, perceived topic knowledge, and need for cognition were obtained, while post-reading tasks included main claim recall, overall recall, inference generation, claim agreement, and text evaluation. The text was positively evaluated and highly persuasive regardless of argument quality, but half of the students either failed to identify the main claim promoted or confused it with individual arguments. Despite a modest but positive association between inference generation and text evaluation, no comprehension measure had a significant main or interactive effect. Need for cognition contributed to positive evaluations in the absence of prior topic knowledge regardless of argument quality. The findings suggest a dissociation between the elaboration associated with deep comprehension and the elaboration associated with critical evaluation with implications for belief formation and the teaching of thinking.

Tracking the relation between measures of prior knowledge and reading comprehension

Cognitive development,Cognitive skills,Comprehension of text and graphics,Developmental processes,Reading comprehension

Daniel Dinsmore, University of North Florida, United States; Emily Fox, University of Maryland, United States;

Prior knowledge is assumed to be a critical variable in successful reading comprehension in many models of reading comprehension. Additionally, empirical evidence has shown that prior knowledge explains a relatively high proportion of variance in studies of reading comprehension. However, given the complex nature of reading, this literature review examines the relation between prior knowledge and reading comprehension more closely. Using a multidimensional lens on this relation, we examined 39 studies over the past five years (with a review of studies going back to 1978 under way) to see how prior knowledge is measured, what types of texts are used, what types of readers are investigated, and what the salient findings are regarding the relation between prior knowledge and reading comprehension. Analyses thus far have indicated that there is a wide variance in measures of prior knowledge with a wide range of reliability and validity evidence presented, primarily the use of informational texts (expository and persuasive), with a wide range of readers, and a wide range of relational coefficients between prior knowledge and reading comprehension outcomes. These mixed findings are explained in relation to the other salient variables under investigation (i.e., developmental characteristics of the reader) as well as strengths of the prior knowledge and reading comprehension measures (i.e., reliability and validity). This multidimensional analysis will give theorists and researchers a more nuanced examination of the relation between prior knowledge and reading comprehension.

B 4

25 August 2015 13:45 - 15:15

Room Green_A2

Paper Presentation

Culture and education

Culture and education and technology-enhanced learning

Keywords: Case studies,Mixed-method research,Cultural diversity in school,Conceptual change,Culture,Social development,Qualitative methods,Teaching/instruction,Social aspects of learning,Primary education,Communities of learners,Educational technology,Instructional design,Educational attainment,Game-based learning,Communities of practice

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 21 - Learning and Teaching in Culturally Diverse Settings,SIG 7 - Learning and Instruction with Computers

Chairperson: Arniika Kuusisto, University of Helsinki, Finland

Creating socially equitable, inclusive and positive school environments: A case study

Case studies,Mixed-method research,Cultural diversity in school,Conceptual change,Culture,Social development

Lefki Kourea, University of North Carolina - Charlotte, United States; Ya-yu Lo, University of North Carolina - Charlotte, United States; Helen Phtiaka, University of Cyprus, Cyprus;

Within the context of increasingly diverse classrooms worldwide, researchers focus on investigating culturally responsive, inclusive and socially equitable schoolwide frameworks. In this qualitative research, the authors examined the implementation features of a schoolwide system known as Positive Behavior Interventions and Supports (PBIS) at an American Southeastern Title I elementary school with a PBIS exemplar state recognition. Employing qualitative tools (e.g., focus group and individual interviews, on-site observations, field note-taking), the authors compared school data with existing literature. Major findings, among others, illustrate the importance of a caring, supportive, positive and culturally responsive enviroment for all students regardless of socio-economic, language, and ethnic backgrounds. Implications and limitations are discussed for the development of a respective PBIS model within a European context.

Sixth gradersí narratives of identity at school education context ñ a case study in Finland

Qualitative methods,Teaching/instruction,Social aspects of learning,Primary education,Communities of learners

Maiju Kinossalo, University of Tampere, Finland; Eero Ropo, University of Tampere, Finland;

Pupil identity construction is a central task of education. Despite, there is a lack of research literature on pupil identity. However, previously it was found that school education does not develop identity optimally (Lannegrand-Willems & Bosma, 2006) and school is a remarkable context for identity development (Kaplan & Flum, 2012). This study aims to gain a deeper understanding about pupil identity construction processes and how identity construction can be

enhanced in the school context. In this study, the approach to identity is from a narrative perspective. The participants (N=19, age 12ñ13-year-olds) were asked to narrate written descriptions of themselves in school during an intervention. The data is being approached from a narrative perspective adopting narrative thematic analysis: the focus is on the content of the narratives (Riessman, 2008). After preliminary reading the data was organized into a nvivo program for analyzing the central themes and dimensions of their narratives. It was found that the pupils described their identities at different dimensions simultaneously: temporal, social, personal and cultural and place contents were recognized. Even so, the data shows that meaningful relationships to subject matters are not created in their narrations. Understanding pupil identity processes at school is necessary for pedagogy and curriculum improvement. The results of this study help us understand the complexity of the process, but this new area of research in education assuredly needs more follow-up studies.

Integrating competition as a game element in the Vocational Secondary Education classroom

Educational technology,Instructional design,Educational attainment,Game-based learning

Sylke Vandercruysse, KU Leuven, Belgium; Mieke Vandewaetere, KULeuven, Belgium; Sarah van Weijnen, KULeuven, Belgium; Jan Elen, KU Leuven, Belgium;

The effectiveness of games is largely dependent on the way games are integrated in the curriculum. This study contributes to the research on this issue by exploring one possible way of dealing with games: How a teacher can integrate the competition component of a math game in the classroom, and how this competition integration influences the studentsí motivation and performance. A quasi-experimental study was set up, with three conditions in the second grade of Vocational Secondary Education. In the first experimental condition, the students played the game with extra math scores as a reward. In the second experimental condition, the reward was film tickets. In the third control condition, competition was not emphasized. There appeared to be no significant main effect of condition on math performance, but a significant main effect of condition on game performance was found. More specific, the second condition exceeds the first and the control condition significantly. Furthermore, there was also a significant main effect of condition on intrinsic motivation. We found that the control condition is significantly more intrinsically motivated after playing the game than the students in the two experimental conditions. Integrating competition thus appears to have a different influence on game performances and motivation.

A meta-synthesis of enculturation discourse and design

Qualitative methods,Teaching/instruction,Culture,Communities of practice

Yotam Hod, University of Haifa, Israel; Ornit Sagy, University of Haifa, Israel;

Enculturation is a central and defining concept of the learning sciences. However, the concept may be under-theorized. Here we have reviewed how enculturation, both conceptually and when designed for in practice, has been taken up by learning scientists. Our goal is to develop an

integrated synthesis of the different ways that enculturation has been thought of and applied. Based on the findings of our meta-synthesis of relevant literature, we propose five different alternatives on an authentic-simulated continuum. We provide illustrative examples of these conceptualizations and designs from past learning sciences research and discuss several relevant phenomena that our authentic-simulated continuum concisely explain. Such findings can help the learning sciences reflect upon its own research.

B 5

25 August 2015 13:45 - 15:15

Room Brown_B2

Paper Presentation

Educational policy

Educational policy

Keywords: Case studies,Qualitative methods,Educational policy,School effectiveness,Primary education,Secondary education,Researcher education,Special education,Reflection,Early childhood education,Teacher professional development,Conversation/ Discourse analysis,Social aspects of learning,Language (Foreign and second),Multicultural education

Sig's: SIG 1 - Assessment and Evaluation,SIG 21 - Learning and Teaching in Culturally Diverse Settings,SIG 23 - Educational Evaluation, Accountability and School Improvement,SIG 24 - Researcher Education and Careers

Chairperson: Christina Chinas, University of Cambridge, Cyprus

Realizing action-oriented school self-evaluation: The role of setting evaluation objectives

Case studies,Qualitative methods,Educational policy,School effectiveness,Primary education,Secondary education

Tali Aderet-German, University of Haifa, Israel;

School Self-Evaluation (SSE) is an important tool, with which schools can examine themselves, identify areas in need of change, and decide upon a course of action for improvement. This paper aims to closely examine the decision-making process of setting SSE objectives, by presenting a case-study of an Israeli school which has been engaged in independent internal SSE for the past decade. In order to investigate the decision-making considerations required of school leadership prior to initiating an SSE process, and the implications this prioritizing entails, interviews were conducted with school leadership, teachers, and key figures in the school evaluation process. In addition, the school enabled the researcher to engage in participatory observation of an SSE process. Using content analysis, recurrent themes were identified in the texts transcribed from

the interviews with the participants, and from the researcher's field notes. The findings of this study suggest that, in addition to resource considerations, the possible actions the management can take following SSE processes are a crucial consideration when deciding which potential issues to evaluate. This case study exemplifies how the management's commitment to act upon the evaluation findings is a major consideration in the decision-making on SSE objectives. An action-oriented approach in which objectives the school is willing and able to pursue are chosen, linking the evaluation process with action, coincides with viewing the school as a learning organization.

Qualitative research in educational settings: Teacher encounters through reflective synergy

Qualitative methods,Researcher education,Special education,Reflection,Early childhood education,Primary education

Maria Kambouri, University of Reading, United Kingdom; Myria Pieridou, Open University London , United Kingdom;

The theoretical background of the researcher, the conduct of research and the usefulness and value of results is extremely important regarding research activities with children with and without disabilities. The aim of this study is to present concerns, questions and reflections on the use of qualitative methodology in two research projects. The first one investigates the educational and social integration of children with disabilities in mainstream primary schools in Cyprus whereas the second one examines the different ways in which pre-primary teachers understand and respond to the childrenís scientific preconceptions. Both research projects used document analysis, interviews and observations for their realisation, working with fourteen and eleven teachers respectively. A reflective process reveals the existence of three similar encounters with the teacher-participants that occurred during the observation and interviews phase in both projects. The identified encounters discussed in this paper are: 1) the ëI am not liableí teacher, 2) the ëuncomfortableí teacher and 3) the ëreliance on authorityí teacher. Research findings support that it is important for researchers to acknowledge that their research affects their participants in different ways. This might contribute in identifying or making such encounters more visible both for researchers and teachers as well. Acknowledging their existence can help teachers be more reflective of their practices and can support researchers when documenting and reporting research in a more valid and sincere manner.

Individual, co-operative and collaborative information use. A conceptual and empirical exploration

Qualitative methods,Educational policy,School effectiveness,Teacher professional development

Roos Van Gasse, University of Antwerp, Belgium; Jan Vanhoof, University of Antwerp, Belgium; Peter Van Petegem, University of Antwerp, Belgium; Kristin Vanlommel, University of Antwerp, Belgium;

Collaboration is crucial in view of qualitative information use. However, Despite the significant amount of information use literature, little is undertaken to bring to the surface school leaders'

and teachers' specific information use activities. From literature is known that the transition of individual to collaborative activities incorporates a wide spectrum in between them. This study therefore investigates school leaders' and teachers' individual, co-operative as well as collaborative information use, taking into account potential influences of school leadership, attitude and self-efficacy. Data gathering was conducted through semi-structured interviews with 12 school leaders and 12 teachers within 6 primary and 6 secondary schools. The results show that school leaders' and teachers' information use predominantly is of individual nature and that their school leadership, attitude and self-efficacy have a hand in the individual, co-operative and collaborative nature of information use. This study contributes to theory building around information use through the validation of concepts around collaboration. Further research is recommended to deepen or widen the findings of this study by using alternative research methods and analyzing techniques.

Diversity and Competence: A discourse-analytic case study of bilingual education policy in Norway

Conversation/ Discourse analysis,Educational policy,Social aspects of learning,Language (Foreign and second),Multicultural education

Jarmila B. Moan, University of Oslo, Norway;

The aim of this paper is to revisit some of the apparent contradictions in the current discourse on bilingual education in Norway through a close discourse-analytic reading of the official public report Diversity and Competence (MER, 2010). As the most comprehensive and recent policy document focusing specifically on the situation of students with other first language than Norwegian in the mainstream educational system, it is meant to provide a comprehensive, evidence-based assessment of the educational realities of these students and recommend viable policy steps. The study will draw on critical discourse analysis (CDA) (e.g. Fairclough, 2003) in order to shed light on how meaning is discursively constructed and how socio-cultural perspectives, practices and identities are enacted in and through language. The analytical process is in its early stage and, hence, there are only preliminary findings based on a contextual, thematic analysis of the selected policy document. The next stage of the analysis will involve a close discourse-analytical reading of the report, following a selection of relevant analytical steps as set out in CDA. A discourse-analytic reading of the report will offer a novel insight on the meaning-making processes involved in unravelling fundamental questions in educational policy, such as levelling out differences in educational opportunities and outcomes between majority and minority students, an expressed premise of the report, and the ideological potency of such discourse.

B 6

25 August 2015 13:45 - 15:15

Room Green_A3

Paper Presentation

Goal orientation

Goal orientation

Keywords: Student learning,Emotion and affect,Goal orientation,Higher education,Motivation and emotion,Quantitative methods,Mixed-method research,Educational policy,Special education,Secondary education,Experimental studies,Social aspects of learning,Primary education,Cooperative/collaborative learning

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 11 - Teaching and Teacher Education,SIG 4 - Higher Education,SIG 8 - Motivation and Emotion

Chairperson: Anouschka van Leeuwen, Utrecht University, Netherlands

The intricate interplay of achievement goals, emotions and academic performance

Student learning,Emotion and affect,Goal orientation,Higher education,Motivation and emotion

Marko Luftenegger, University of Vienna, Austria; Christiane Spiel, University of Vienna, Austria; Barbara Schober, University of Vienna, Austria;

In the present research, the recently proposed 3x2 model of achievement goals is tested and associations with achievement emotions and their joint influence on academic performance are investigated. The study was conducted with 388 students using the 3x2 Achievement Goal Questionnaire and the scales enjoyment and boredom of the Achievement Emotion Questionnaire. Exam grades were used as an indicator of academic performance. Findings from CFAs provided strong support for the proposed structure of the 3x2 achievement goal model. Self-based goals and other-approach goals predicted enjoyment. Task-approach goals predicted boredom. Enjoyment and other-based goals were found to predict performance. No mediation effects were found. Implications for educational practice are discussed.

Self-determined goal pursuit and emotional experience: An Experience Sampling Approach

Quantitative methods,Emotion and affect,Higher education,Motivation and emotion

Elina E. Ketonen, University of Helsinki, Finland; Julia Dietrich, University of Jena, Germany; Katariina Salmela-Aro, Helsinki Collegium for Advanced Studies, Finland; Kirsti Lonka, University of Helsinki, Finland;

Based on self-determination theory (SDT), this study tested the assumption that emotions experienced by students daily in educational settings are impacted by educational goals. We tested whether setting autonomous vs. controlled study-related goals in the morning predicted studentsí emotional states, such as positive or negative activating state, during the day. Autonomous goals should increase the likelihood to experience positive emotions and controlled goals the likelihood of experience negative emotions. In a standardized mobile phone diary

study, 55 university students (69% female) were beeped five times a day for 14 consecutive days. In the morning, participants named up the three educational goals for the current day. They then reported to what extent they pursued these goals for autonomous and controlled reasons. During the day, participants reported their current activity three times and appraised that activity in terms following emotions: interest, enthusiasm, determination, energy (measuring positive activating state), and anxious, nervousness, irritation, and stress (measuring negative activating state). We applied multilevel modeling to examine the effects of goals on emotional states. Results showed that setting autonomous goals was related to a higher likelihood of positive activating emotional states. Controlled motivation was related to a higher likelihood of negative activating emotional states. This study found evidence that self-determined educational goals are associated with more positive emotional experience in studying context. Further, our findings imply that the principles of SDT operate not only for mid- and long-term personal goals, but also for the short-range educational goals that students set every day.

The structural and cultural appearance of special needs care in mainstream secondary schools

Mixed-method research,Educational policy,Special education,Secondary education

Charlotte Struyve, KU Leuven, Belgium; Chloe Meredith, KU Leuven, Belgium; Bieke De Fraine, KU Leuven, Belgium; Karin Hannes, KU Leuven, Belgium; Nienke Moolenaar, University of Utrecht, Netherlands; Sarah Gielen, KU Leuven, Belgium;

International educational research and policy argue that the support of students with special educational needs in mainstream schools should become a ëwhole-school approachí, and thus the responsibility of every single member of the school team instead of one specialized teacher. However, until now, little attention has been paid to if and how the whole-school approach is implemented in schools and to how school team members perceive the idea of special needs care as a whole-school approach. The change in notion concerning special needs care coincides with the growing belief in collaborative practices in schools. Many studies have indicated that collaboration between teachers augments the collective efficacy of the entire school team (Moolenaar, 2012), which finally leads to better student achievement (Louis, Marks, & Kruse, 1996). A promising method for making collaboration patterns in schools visible is Social Network Analysis (see e.g., Scott & Carrington, 2012). Nevertheless, no study has yet used the strength of Social Network Analysis to visualize the collaborative practice of teachers in schools concerning special needs care and to deepen if and how special needs care flows throughout schoolsí network. In this study, we aim at fully investigating how special needs care takes place in schools by paying attention to both cultural and structural aspects. Consequently, a mixed methods approach is applied, which helps us to catch the whole picture of the implementation of the whole-school approach and to contribute to more theory-building.

If-then planning improves childrenís group cooperation at school

Experimental studies,Student learning,Goal orientation,Social aspects of learning,Primary education,Cooperative/collaborative learning

Anika Fasche, Ulm University, Germany; Frank Wieber, University of Konstanz, Germany; Peter M. Gollwitzer, University of Konstanz, Germany; Tobias Heikamp, University of Leuven, Belgium; Gisela Trommsdorff, University of Konstanz, Germany;

An important objective of elementary school is teaching children to successfully cooperate in groups. As cooperative tasks often require deferring individual goal pursuit in favor of a group goal, cooperation places high demands on childrenís ability to regulate their goal striving while working on the group goal. To test whether specific if-then plans (implementation intentions; Gollwitzer, 1999) improve childrenís cooperative behavior, groups of children in fourth-grade elementary classrooms received instructions about a useful cooperation strategy for a group puzzle task, either in the form of an if-then plan (implementation intention condition) or without (goal-only intention condition). In the puzzle task, the group goal was to attain as many points as possible. Each child received presorted puzzle pieces, half of which came from a brown butterfly that was worth the most points but required exchanging puzzle pieces with other group members (cooperation); the other half belonged to a blue butterfly that was worth fewer points but did not require the exchange of any puzzle pieces (no-cooperation). The results showed that implementation intention groups were more successful at striving for the cooperative goal than goal-only intention groups, as indicated by higher completion rates for the cooperation puzzle pieces. These higher rates of cooperation did not negatively affect the completion rates for the no-cooperation puzzle pieces. Implications for collective goal pursuit as well as if-then planning are discussed with respect to future research and potential applications.

B 7

25 August 2015 13:45 - 15:15

Room Brown_B4

Paper Presentation

Higher education

Higher education

Keywords: Qualitative methods,Student learning,Achievement,Self-efficacy,Self-regulation,Higher education,Educational policy,Educational attainment,Case studies,Teacher professional development,Developmental processes

Sig's: SIG 4 - Higher Education

Chairperson: Edith Braun, University of Kassel, Germany

The transition to university: Flowing or struggling? A qualitative study

Qualitative methods,Student learning,Achievement,Self-efficacy,Self-regulation,Higher education

Sanne van Herpen, Erasmus University Rotterdam, Netherlands; Sabine Severiens, Erasmus University Rotterdam, Netherlands; Adriaan Hofman, Erasmus University Rotterdam, Netherlands;

In this qualitative longitudinal study adjustment behaviour of first-year students (N=74) during the transition to higher education is investigated. In-depth interviews concerning e.g. effort, self-efficacy, motivation and performance were conducted three months before enrolment and three months after enrolment with the same respondents. In the interview data four student types could be distinguished. ìFlowíersî are students who go with the flow of university life and seem to adjust in an unproblematic way. These students adjust to the new learning environment in an (pro-)active or passive way. ìStrugglersî are students who face (several) problems and do not seem to succeed in adjusting to university. They seem to struggle in a positive or negative manner with their adjust problems. The results of this study helps higher education institutions to create more tailored support to students who go to university. The findings suggest that supportive interventions could be more effective by focusing on self-regulated learning which includes effort, self-efficacy and motivation, and interpersonal communication (creating a network, cooperate with peers).

Early predictors of first-year academic achievement: Effort, self-efficacy and college choice

Educational policy,Student learning,Achievement,Educational attainment,Self-efficacy,Higher education

Sanne van Herpen, Erasmus University Rotterdam, Netherlands; Marieke Meeuwisse, Erasmus University Rotterdam, Netherlands; Lidia Arends, Erasmus University Rotterdam, Netherlands;

This study investigated the influence of demographic factors, high school GPA, pre-university psychosocial study skill factors (PSFs) and college choice behaviour on first-year academic achievement at university. An online questionnaire concerning these topics was completed by 453 first-year students during application. The included pre-university PSFs were high school effort and academic self-efficacy. College choice behaviour was operationalised as motives for choosing a programme, moment of college choice, degree of orientation, and degree of certainty about the chosen programme. Logistic regressions showed that high school effort incrementally predicted first-year performance, beyond high school GPA, ethnic background and chosen discipline. College choice behaviour had a limited significant incremental influence on achieving the first-year performance norm or not. These results suggest that, in addition to the well-known effects of high school GPA and ethnic background, high school effort is an important pre-university psychosocial factor in predicting first-year performance. It is recommended that institutions take this in mind when preparing and selecting students.

Educational development through the scholarship of teaching and learning ñ A case study

Case studies,Teacher professional development,Developmental processes,Higher education

Torgny Roxa, Lund University, Sweden; Katarina Maartensson, Lund University, Sweden; Thomas Olsson, Lund University, Sweden;

University teaching often appears resilient to change initiatives that often fail to provide evidence of sustained impact. Thus case study suggests that this is due to a deficit in theoretical understanding of higher education organisations. Through reference to empirical research it is argued that the significant conversations academic teachers have with each other are central to an understanding the stability in the system. This research suggests that it is during collegial conversations that academic teachers construct and maintain their conceptual understanding of teaching and student learning. The case study presented is based on the assumption that if these conversations are influenced, the educational quality is likely to be influenced. The paper outlines the theory and uses scholarship of teaching and learning as a template for influencing the way academic teachers communicate about teaching and student learning. Several elements in a strategic initiative to develop university teaching in a faculty of engineering are summarised. Evidence of impact showing improved student learning as well as changes in the way teachers communicate about teaching and student learning are provided. It is concluded that the educational quality develops in the university faculty in focus. This asserts the scholarship of teaching and learning as a guiding principle for educational development in higher education organisations.

B 8

25 August 2015 13:45 - 15:15

Room Brown_B5

Paper Presentation

Higher education

Higher education

Keywords: Qualitative methods,Student learning,Literacy,Higher education,Communities of practice,Quantitative methods,Assessment methods and tools,Teacher professional development,Teaching/instruction,Peer interaction,Interdisciplinary

Sig's: SIG 11 - Teaching and Teacher Education,SIG 12 - Writing,SIG 4 - Higher Education

Chairperson: Stacia C. Miller, Midwestern State University, United States

Becoming a (peripheral) participant in the academic community: Master thesis writing

Qualitative methods,Student learning,Literacy,Higher education,Communities of practice

Karl-Heinz Pogner, Copenhagen Business School, Denmark; Vibeke Ankersborg, Copenhagen Business School, Denmark;

Our paper aims at investigating how ëperipheral participantsí tackle the interrelation of knowledge and text production in the academic community, and hereby negotiate their identity

shaped by academic rigor, societal / organizational relevance, and their future profession. Our pilot study at the Copenhagen Business School shows the following preliminary results: There is a clear interdependency between research design (according to Academia as Communities of Practice) and the studentsí approach to writing. Academic text production enhances the studentsí insights and understanding of their own text (according to the expectations of the Academic Discourse Communities). The crucial question that arises from the pilot study, however, is how to enhance studentsí awareness of the driving, epistemic role of writing. The global structure of the text-produced-so-far seems to play an important role for the ability to produce text on the local level. There seems to be a kind of circle where, on the one side, reading, reading-to-write, and writing develop the structure, but a chosen structure, on the other hand, facilitates text production. A variety of factors inside and outside the business school affect the studentsí approaches to writing (as text production in the Academic Discourse Communities) and the thesis project process (as knowledge production in the Academic Communities of Practice). But regardless these factors at least some students are caught in a kind of ìdouble bindî-situation: they are asked to act as members of the academic community, but they are also expected not to act like full professional academics ñ yet.

The "Seven Cs" of effective teaching ñ Development of teacher training students

Quantitative methods,Assessment methods and tools,Student learning,Teacher professional development,Teaching/instruction,Higher education

Stephan Wernke, Universitat Oldenburg, Germany; Klaus Zierer, University Oldenburg, Germany; Jochen Werner, University Oldenburg, Germany;

One of the most important questions on learning and instruction is what makes a teacher effective. With ÑVisible Learningì John Hattie (2009) carried out a synthesis of more than 800 meta-analyses on achievement, and 2012 he summarizes his results in ÑVisible Learning for Teachersì. He develops eight mindframes that promote effective teaching. At the same time Ferguson (2010) has done some research on how to measure teacher effectiveness. Within the Tripod Project "Measure of Effective Teachingì (MET) he has come up with what he calls the ÑSeven Csî which show what responsibilities a good teacher needs, and what makes a difference in the learning environment. Both studies provide skills of effective teaching, which should be pursued within teacher education. Motivated through Hattie/s results and based on the findings of the MET-Project we designed a self-rating questionnaire to measure students skills of effective teaching. The aims of our study were to examine to what extend teacher training students feel prepared to be effective teachers, particularly with regard to the ÑSeven Csî, and to what extend these self-ratings change in the course of their first practical experience. Students had to answer a questionnaire three times: before a preparatory seminar, after this seminar, and after completing an internship. Results of the study show that the self-assessments of the students change significantly over the three time points.

Birds of a feather flock together? The importance of dyadic fit within formal mentoring programs

Quantitative methods,Peer interaction,Interdisciplinary,Higher education

Denise Dlugosch, Ludwig-Maximilians Universitat (LMU), Germany; Simone Kaminski, LMU Munich, Germany; Silja Kennecke, LMU Munich, Germany; Sonja Militz, LMU Munich, Germany; Silke Weisweiler, Ludwig-Maximlians-University Munich, Germany; Dieter Frey, LMU Munich, Germany;

Formal mentoring programs are more frequently implemented by universities e.g. in order to foster the socialization of students. One major challenge of formal mentoring programs is to match well-fitting tandems of mentors and proteges. Unfortunately, little is known about dyadic factors that affect the mentoring provided beyond gender and race of protege and mentor (Wanberg, Welsh, & Hezlett, 2003). Therefore, this study aims to identify those measurable matching criteria (i.a. personal characteristics and personality traits) which predict protege satisfaction with the mentor significantly. In line with theory (e.g. similarity attraction paradigm; Byrne, 1971) and research on complementary fit (e.g. Cuperman & Ickes, 2009), similarity in major subject and gender leads to higher protege satisfaction. Further, polynomial regression and response surface analysis (RSA) suggest that for extraversion and faith in intuition a congruence effect on satisfaction occurs. When both mentor and protege are rather introverted, the proteges are more satisfied with their mentors as if both are extroverted (same applies for intuition). As hypothesized, RSA revealed that when both mentor and protege are incongruent on neuroticism, satisfaction decreased. Finally, RSA for openness and need for cognition showed that satisfaction increased when incongruence between mentor and protege was strong, which contradicted our predictions. We contribute to mentoring research by showing that congruence is essential when predicting protege satisfaction with the mentor. Moreover, our results suggest that complementary fit can play a role in pairing mentors and proteges. This study gives practitioners insight into the effects of different matching criteria on protege satisfaction with the mentor.

B 9

25 August 2015 13:45 - 15:15

Room Cyan_F1

Paper Presentation

Instructional design

Instructional design

Keywords: Quantitative methods,Comprehension of text and graphics,Vocational education,Computer-assisted learning,Experimental studies,Educational technology,Social interaction,Secondary education,Instructional design,Conceptual change,Misconceptions,Biology,Design based research,Teacher professional development,Teaching/instruction

Sig's: SIG 27 - Online Measures of Learning Processes,SIG 3 - Conceptual Change,SIG 6 - Instructional Design,SIG 7 - Learning and Instruction with Computers

Chairperson: Tino Endres, University of Freiburg, Germany

Air traffic control: Visual expertise in a dynamic problem solving task

Quantitative methods,Comprehension of text and graphics,Vocational education,Computer-assisted learning

Halszka Maria Jarodzka, Open University, Netherlands; Paula Gouw, Open University of the Netherlands, Netherlands; Ludo van Meeuwen, Open Universiteit Nederland, Netherlands; Saskia Brand-Gruwel, Open University, Netherlands;

Many professions require the examination of complex, dynamic visualizations (e.g., medical specialists, air-traffic controllers). Thus, in the training of these professions, students have to learn to visually examine and interpret such visualizations. To develop educational material and strategies for this training, it is important to understand how such visual skills develop over expertise. A prior study in the domain of air traffic control showed how higher levels of expertise yield visual problem solving strategies characterized by more efficient retrieval of relevant information and more efficient visual scan paths. This study, however, was conducted within a simplified scenario with stills of radar screens. In the current study we increased the complexity of this task to a more realistic scenario with dynamic radar simulations. Twelve air traffic controllers of three expertise levels (experts, intermediates, and beginners) worked for ten minutes on an air traffic control simulator while their eye movements were recorded. Results show that experts exceed the other groups on task performance. On a perceptual level, however, only beginners and intermediates differed significantly: beginners mainly focus on the radar area they were responsible for. Intermediates, in contrast, looked longer on neighboring areas from which airplanes were coming in or leaving to. These findings indicate (1) how beginners should re-direct their attention to other areas to be able to predict upcoming situations and (2) that experts do not look differently at the visualizations than the other groups, but process the information differently so that they end up with better solutions.

Blogs as a tool to promote creative dialogue: An experimental study

Experimental studies,Educational technology,Social interaction,Secondary education

Manoli Pifarre Turmo, University of Lleida, Spain; Concepcion Bort, Universitat de Lleida, Spain;

This paper explores how blogs may be used to support secondary studentsí creation of a dialogic space capable to think and create together new solutions for a complex problem. To this end, our study, first, characterized ìcreative dialogueî in a blog environment. Second, our study designed, implemented and evaluated an instructional design that emphasis the use of a blog from a dialogic perspective to solve complex and open-ended problems. The study aims to study if there are differences in studentís creative dialogue depending if they have used the blog or not during a course. A quasi-experimental study was designed in which fifty-eight post-secondary education students participated. The procedure of the study was a pre-test, intervention and post-test. Thirty students formed the experimental group, which used a blog during the intervention and twenty-

eight students formed the control group, without using a blog. Studentsí written solutions to the pre and posttest activity were categorized. Mean comparison of number of categories related with creative dialogue of both groups was carried out using the U of Mann Whitney test. Statistical differences were found between both groups, in favor of experimental students. Our study showed that the use of a blog from a dialogic perspective helped students to incorporate in their dialogue features of creative dialogue. Students who had used the blog generated, planned and produced more new ideas and solutions to the problem than students who had not used the blog. Dialogic education implications will be discussed.

Correcting a peer's misconceptions about natural selection improves own understanding

Experimental studies,Instructional design,Conceptual change,Misconceptions,Biology

Christa Asterhan, Hebrew University of Jerusalem, Israel; Miriam Babichenko, Hebrew University of Jerusalem, Israel;

Previous research has shown benefits of studying and correcting erroneous examples, but these studies have predominantly focused on elementary school mathematics. The present study tests the effect of error correction activities on a complex science topic for which misconceptions are well documented, namely natural selection. Sixty-two students learned about natural selection, and completed a test assessing their conceptual understanding. They then either corrected erroneous explanations based on common misconceptions (error correction condition), or answered the open items themselves (control condition). Moreover, half of the students in the error correction condition were led to believe that their corrections would be send to the error-making students, whereas the other half was not. Conceptual understanding was assessed a week following. Analyses of pre- to posttest gains showed an overall effect of error correction. Follow-up comparisons further showed that whereas belief in a socially relevant action (sending corrections) led to higher gains compared to the control condition, no differences were found between the control and the no-send condition. Analyses of student behavior during the intervention phase mirrored these results, suggesting that the act of correcting accounted for the pre-post outcomes.

Design methods used in educational design research

Design based research,Instructional design,Teacher professional development,Teaching/instruction

Veli-Matti Vesterinen, Stockholm University, Finland; Theresa Berg, Aalto University, School of Arts, Design and Architecture, Finland;

During the past few decades, several interconnected research traditions have paid more and more attention to the process of educational design. This paper discusses how recent research on human-centric design could contribute to design methods used in educational design research. The focus is especially on the use of co-design strategies and on balancing a concern for understanding current practices with a concern for envisioning alternative or future practices. The design methods used in educational design research are often quite schematic and developed

solely from the point of view of researchers/designers. They tend to devalue context and stance of the research subjects. We conclude that educational design research should focus especially on the day-to-day practice of teachers and use of co-design methodologies.

B 10

25 August 2015 13:45 - 15:15

Room Green_A5

Paper Presentation

Learning disabilities and special education

Learning disabilities and special education

Keywords: Quantitative methods,Assessment methods and tools,Special education,Competencies,Reading comprehension,Primary education,Experimental studies,Comprehension of text and graphics,Learning disabilities,Multimedia learning,Educational technology,Instructional design,Learning and developmental difficulties,Problem solving,Social aspects of learning,Student learning,Mathematics,Communities of learners

Sig's: SIG 15 - Special Educational Needs,SIG 6 - Instructional Design

Chairperson: Barbara Arfe, University of Padova, Italy

Involving SEN students in system-level assessment:Linking outcomes from test modifications using IRT

Quantitative methods,Assessment methods and tools,Special education,Competencies,Reading comprehension,Primary education

Beata Szenczi, Eotvos Lorand University , Hungary; Tibor Vigh, University of Szeged, Hungary; Agota Szekeres, Eotvos Lorand University, Hungary; Gabriella Zentai, Institute of Education, University of Szeged, Hungary;

The aim of the study was the piloting of an adaptation of the Hungarian National Assessment of Basic Competencies for SEN students. The study used three tests: the original test which was administered to SEN students (N=172) whose disability did not call for modification (students with physical disabilities, highly functioning autistic and hearing impaired students) (Cronbachís alpha=0.95), and modifications for students with visual impairment (N=67) (Cronbachís alpha=0.88) and the other SEN groups (mild intellectual disabilities, speech disorders, learning disabilities, more severe autism and hearing impairment) (N=690) (Cronbachís alpha=0.88). Modified tests included anchor items by which data were calibrated to a common scale. A total of 929 randomly selected SEN students participated in our study. The paper presents the results

of an Item Response Theory analysis of the reliability and applicability of the reading subtests (modified and non-modified). Results of the IRT analyses proved to be reliable (EAP/PV reliabilities range between 0.86 and 0.95). Items of the original test fitted the latent ability level of the heterogeneous SEN samples (variance of the latent ability=1.63 logit). For the low vision version of the test, most of the students were above average latent ability (logit value=0) (mean of the latent ability=0.69 logit), and in the third test items were mostly missing from the lower ability levels. The IRT approach to test linking proved to be a valid and practical method that can be applied to design and develop test modifications that promote the meaningful participation of SEN students in educational assessments.

Contrarious results from picture inspection for individuals with dyslexia

Experimental studies,Special education,Comprehension of text and graphics,Learning disabilities,Reading comprehension,Multimedia learning

Eva Wennas Brante, University of Gothenburg , Sweden;

Readers with low pre-knowledge of a subject seem to benefit from seeing a picture relevant to the content before reading. Further, the multimedia-principle states that students learn better from words and pictures than from words alone. Thus it would be expected that persons with dyslexia should use pictures as an enhancement of their reading comprehension. Results from an eye-tracking experiment with 19 dyslexic and 27 non-dyslexic participants (m= 23,8 years) showed contrarious results. Reading comprehension was measured in a combination of on-line measures (eye-tracking) and off-line measures. The information material concerned art genres. Control groupís time to first fixation on picture was significantly lower than the dyslexic groupís. The dyslexic group fixated the pictures less and later on in the processing, their average dwell time on pictures were lower and, their scores on multiple choice reading comprehension questions were lower than the dyslexic group with only text. Inspection patterns from a neutral, a figure- background and a complex picture were compared. The control group had significantly higher dwell times on these as well, originating from the complex picture. This picture was inspected before reading by a majority of the participants with dyslexia. The oral answers after this stimuli showed more paraphrasing from the dyslexic group. This result shows that it is not only dwell time on pictures that matter, rather, when pictures are inspected. With multimodal learning materials today it should be verified if multimodal materials are beneficial for readers with dyslexia, or if a sequential presenting is better.

Learning from video examples in children with and without Autism Spectrum Disorder

Educational technology,Instructional design,Special education,Learning and developmental difficulties,Problem solving,Social aspects of learning

Tamara Van Gog, Utrecht University, Netherlands; Margot van Wermeskerken, Erasmus University Rotterdam, Netherlands; Bianca Grimmius, Erasmus University Rotterdam, Netherlands;

Video-based modeling examples in which an instructor demonstrates and explains a procedure, are increasingly used in education, because they have become much easier to create and distribute in e-learning environments. However, little is known about design guidelines to optimize the effectiveness of video examples for learning. Given that the human face is known to capture observersí attention, one design consideration is whether showing the instructorís face in the video example would help or hinder learning. It is also unclear whether effects of seeing the instructorís face would be the same for all learners; for instance, children with Autism Spectrum Disorder (ASD) have been found to look less at faces. Therefore the present study investigated (1) whether learning outcomes of children without ASD are affected by seeing the instructorís face in the video example and (2) how children with and without ASD distribute their attention when studying a video example in which the instructorís face is visible and whether this affects their learning outcomes. Participants twice studied a video example in which an instructor demonstrated how to build a molecule (glutamine) and after each view they attempted to build the molecule themselves and answered questions about the molecule. Their eye movement data were recorded while watching the examples. Results showed that children without ASD who saw the instructorís face paid less attention to the task than children who did not see the face and children with ASD. However, despite differences in viewing behavior, there were no differences in learning outcomes.

Academic skills of Kosova children with mathematical learning difficulties

Quantitative methods,Student learning,Learning and developmental difficulties,Mathematics,Primary education,Communities of learners

Linda Salihu, University of Pristina , Albania;

This study examined the development of basic academic skills in Kosova school-age children with mathematical learning difficulties in terms of their characteristics such as gender, living area, socio-economic status, and performance level. A special emphasis was placed particularly to longitudinal investigation of the development of mathematics and reading skills in 85 fourth-grade children identified with MLD, over a 2-year and 4-month period. The findings confirm that childrenís initial level of math skills was the most powerful determinant of their later mathematics performance as well as reading performance and vice versa, the initial level of reading skills was also uniquely predictive of reading comprehension and math performance. The childrenís background characteristics did not add explanatory variance in performance outcomes over the initial math and reading skills. The high predictive correlations between math and reading skills suggest that these skills may have some common cognitive grounds. The findings of the study provide powerful confirmation for the importance of assessment in identification of children with mathematical learning difficulties in order to help them as early as possible improve their foundational academic skills.

B 11

25 August 2015 13:45 - 15:15

Room Green_A6

Paper Presentation

Mathematics education

Mathematics education

Keywords: Cultural diversity in school,Language (Foreign and second),Mathematics,Primary education,Qualitative methods,Student learning,Problem solving,Reasoning,Higher education

Sig's: SIG 17 - Qualitative and Quantitative Approaches to Learning and Instruction,SIG 21 - Learning and Teaching in Culturally Diverse Settings

Chairperson: Sophie Batchelor, Loughborough University , United Kingdom

Effects of general and mathematical language proficiency on arithmetics and word problem solving

Cultural diversity in school,Language (Foreign and second),Mathematics,Primary education

Katrin Bochnik, Ludwig-Maximilians-Universitat (LMU), Germany; Stefan Ufer, Ludwig-Maximilians-Universitat (LMU), Germany;

Compared to native speakers, lower mathematical achievement of second language learners was reported repeatedly in the past, in Germany even at the end of grade 1. Language-related explanations of these disparities reveal the importance of instructional language proficiency especially for demands that require conceptual understanding (e.g. solving word problems), indicating varying language effects on different facets of mathematical achievement. Studying language effects in detail, the relevance of language proficiency that is specific to mathematics, e.g. mathematical text comprehension and specialised vocabulary, is an open question with strong educational implications. We report on the first measurement point of a longitudinal study with N=377 third graders, analysing the influence of speaking a non-German language at home, instructional language proficiency, mathematical academic language proficiency and general cognitive abilities on two different facets of mathematical achievement. We find significant disadvantages of children from non-German speaking homes at the beginning of third grade for word problems as well as for basic arithmetic skills, e.g. subtraction. All differences can be explained by proficiency in the instructional language German. In addition, mathematical text comprehension is significantly related to mathematical achievement, whereas specialised mathematical vocabulary is of less importance. The implications of these results regarding demands of general and subject specific language skills as a prerequisite and an objective for mathematical learning are discussed.

Algebraic proof construction process of university students

Qualitative methods,Student learning,Problem solving,Reasoning,Mathematics,Higher education

Miwa Inuzuka, Taisho University, Japan;

The present study focused on the algebraic proof construction process of fourteen university students. Each student tried to construct the proof. Four participantsí proofs succeeded, while those of the other ten did not. The analysis of think-aloud protocols revealed four clusters of proof process: forward construction, limited evidence, trial and error, and memory retrieve. All the successful participants were included in forward construction cluster. The participants of limited evidence cluster showed only limited and inadequate evidence. The participants of trial and error cluster had mixed characteristic of former two clusters. The participants in the last cluster, memory retrieve, tried to retrieve the episode when they had learned the proof and replicate what they remembered, without expressing the principle at stake. Based on the results, the cognitive model was developed. Educational suggestions and future research directions are discussed.

B 12

25 August 2015 13:45 - 15:15

Room Green_A7

Paper Presentation

Moral development and religious education

Moral development and religious education

Keywords: Mixed-method research,Developmental processes,Morality,Reasoning,Early childhood education,Experimental studies,Quantitative methods,Instructional design,Learning approaches,Religious studies,Primary education,Qualitative methods,Pre-service teacher education,Values education,Higher education,Attitudes and beliefs

Sig's: SIG 11 - Teaching and Teacher Education,SIG 13 - Moral and Democratic Education,SIG 19 - Religious and Spiritual Education

Chairperson: Bettina Doering, Leibniz Universitat Hannover, Germany

Children's epistemic beliefs in the context of moral reasoning

Mixed-method research,Developmental processes,Morality,Reasoning,Early childhood education

Susan Walker, Queensland University of Technology, Australia; Jo Lunn Brownlee, Queensland University of Technology (QUT), Australia; Donna Berthelsen, Queensland University of Technolgoy, Australia; Eva Johansson, University of Stavanger, Norway; Laura Scholes, Queensland University of Technology, Australia; Julia Mascadri, Queensland University of Technology (QUT), Australia;

Epistemic beliefs are views held about the nature of knowing and knowledge. The study investigated the epistemic beliefs of 178 children, aged 6 years, who were in their first year of

school. The children responded to questions in one-on-one interviews about the nature of knowledge for three scenarios which described situations concerned with morality, personal preference, and an ambiguous fact. The majority of children (n = 154) believed that there was only one right answer when reasoning about the moral situation; were less likely to say there was only one right answer when reasoning about personal preference (n = 69); or an ambiguous fact (n = 60). These data showed that, at age 6 years, childrenís beliefs were objectivist in nature (knowledge is certain) when it comes to moral values. However, children were showing signs of more subjectivist epistemologies when they acknowledge the right to hold diverse opinions in matters of personal preference or when knowledge was less certain (ambiguous fact). These findings indicate that young children use multiple levels of reasoning about the nature of knowedge and differentiate between reasoning in the moral domain and other domains.

Does the learning environment matter? Results of a quantitative study in German primary schools

Experimental studies,Quantitative methods,Instructional design,Learning approaches,Religious studies,Primary education

Katharina Kindermann, University of Siegen, Germany; Ulrich Riegel, Siegen University, Germany;

The research project ìThe church as an out-of-classroom learning environmentî (2012 ñ 2015) investigates the learning effects and processes of field trips to the church in religious education at school. We therefore cooperated with 67 classes of third grade, summing up to a total of 1,143 students. In this presentation we analyze data from that part of our study which is concerned with the cognitive learning impacts of field trips. All 67 classes pass a curriculum about the church build-ing. We divide the classes into four groups that vary in the number and timing of field trips. Before and after the curriculum we gather information on the studentsí knowledge about the church and certain background variables. Our results reveal that doing field trips can indeed increase learning outcomes compared to ìtraditionalî learning inside the classroom. This is however only true if stu-dents are given the opportunity to familiarize themselves with the unusual learning environment before cognitive input is given. Therefore field trips to the church should be done more than one time. If this is not the case, it might be better to only teach the subject matter inside the classroom.

Values in teacher education

Qualitative methods,Pre-service teacher education,Morality,Values education,Higher education

Alfred Weinberger, Padagogische Hochschule der Diozese Linz, Austria; Angela Gastager, University of Teacher Education Styria, Austria;

The professional education of teachers prioritizes technical values and lacks a profound engagement with the moral values. There is little empirical research that focuses on the values of teachers or pre-service teachers. In our exploratory study we encouraged pre-service teachers to make their values explicit and to reflect on their impact in typical situations of uncertainty in the

classroom. We collected qualitative data using three instruments and calculated frequencies on the level of analysis. The results show the heterogeneity of values, values definitions and implementation strategies of values. There seems to be no consensus about the most important values between pre-service teachers. Although pre-service teachers highlight moral values they lack a moral language, e.g. in order to define values or to put them into practice for the sake of values education. In uncertain situations technical values like design qualities are important. These findings confirm results of empirical studies with in-service teachers and indicate that there is a need to put more emphasis in teacher education on the moral aspects of teaching.

Purpose in Finnish teacher education

Quantitative methods,Pre-service teacher education,Attitudes and beliefs,Morality,Values education

Elina Kuusisto, University of Helsinki, Finland; Kirsi Tirri, University of Helsinki, Finland;

In this presentation we describe how purpose in teaching is integrated into the curriculum for student teachers at the University of Helsinki. Additionally, we report empirical findings from Finnish student teachers (N=372) at this same university. Research questions are: 1) Do elements of purpose (Damon, Menon & Bronk, 2003) predict self-estimated competencies for purpose education? 2) What kinds of purpose profiles do Finnish student teachers have? Results of regression analysis show that presence of purpose, goal-directedness and beyond-the-self ñorientation predict competencies for purpose education. Instead, search for purpose did not explain estimations of student teachersí abilities to foster purpose. K-Cluster analysis revealed three purpose orientations among Finnish student teachers: Dabblers (n=144; 39%), Purposeful (n=90; 28%), and Disengaged (n=84; 23%), Dreamers (n=54; 15%).

B 13

25 August 2015 13:45 - 15:15

Room Brown_B8

Paper Presentation

Motivation

Motivation

Keywords: Quantitative methods,Goal orientation,Intelligence,Secondary education,Motivation and emotion,Student learning,Teaching/instruction,Teacher professional development,Qualitative methods,Competencies,Primary education,Learning in context

Sig's: SIG 11 - Teaching and Teacher Education,SIG 8 - Motivation and Emotion

Chairperson: Christian Brandmo, University of Oslo, Norway

Motivational aspects of implicit theories of intelligence and gender, a structural equation modeling

Quantitative methods,Goal orientation,Intelligence,Secondary education,Motivation and emotion

Anna-Carin Jonsson, University of Gothenburg, Sweden; Monica Rosen, University of Gothenburg, Sweden;

This study investigates if 16-17 years old upper-secondary school students (N = 619) implicit theories of intelligence differ dependent on their gender. It has been suggested that girls have stronger entity theories than boys. A second question is whether implicit theories of intelligence should be interpreted as a one-dimensional or two-dimensional concept. Through structural equation modeling (SEM) we analyses data from a Swedish upper-secondary school and the results shows that at least in this sample no gender effect could be found. Entity theories and incremental theories showed up to be a one-dimensional concept partly in line with more recent interpretations.

Who is responsible for this? Teachers', students' and parents' attributions of responsibility

Quantitative methods,Student learning,Teaching/instruction,Secondary education,Motivation and emotion

Kerstin Helker, RWTH Aachen University, Germany; Marold Wosnitza, RWTH Aachen University, Germany;

Existing research has identified a personís sense of personal responsibility as having major motivational implications for a personís actions (Berkowitz & Daniels, 1963). Despite being conceptualised as an individualís sense of internal obligation (Lauermann & Karabenick, 2011), responsibility in everyday contexts is often attributed by and to other people. Different perspectives on responsibility may, however, not always overlap, especially in the school context where tasks and liabilities often remain ill-defined. Thus, this study examined responsibility attributions within triads of a student with their parents and their teachers in order to identify patterns of responsibility attributions that may affect other variables such as student motivation and school success or failure. Participants were 272 students, 114 parents and 25 teachers at a school that runs a teaching concept that fosters studentsí self-responsible learning by preparing them to autonomously select and work on all learning material which is provided in the form of modules. Findings reveal varying perspectives on teachersí, studentsí and parentsí responsibility as the three agents do not only express different degrees to which they hold themselves responsible but also differ with regard to whom they perceive to be most responsible with respect to school-related outcomes. Some parents express a strong sense of personal responsibility for school matters while others attribute responsibility for these outcomes to their childís teacher. Such underlying patterns of responsibility attribution between the three agents may thus influence student motivation, learning and school success or failure.

Studentsí perceptions of teacher quality and how it affects their motivation for learning

Quantitative methods,Teacher professional development,Secondary education,Motivation and emotion

Marjon Fokkens-Bruinsma, University of Groningen, Netherlands; Bert Slof, Utrecht University, Netherlands; Esther Canrinus, University of Groningen, Netherlands;

This study focuses on the question of how student motivation is affected by their teachers, more specifically the teacherís quality. Student motivation was defined -based on the expectancy-value theory- in terms of self-efficacy, task values and test-anxiety. Teacher quality was defined in terms of teachersí capabilities to carry out pedagogical and didactical activities, such as managing classrooms and providing clear instruction. 300 secondary school students in one school filled in questionnaires on their motivation and perceptions of their teacherís quality. Analyses indicated that students scored high on all motivation variables. Furthermore, students were satisfied with the quality of their teachers, e.g. in terms of classroom management and providing clear instruction. Clear instruction was a positive predictor of self-efficacy and a negative predictor of test-anxiety. Thus students who found that their teacher explained the subject clearly were more positive about their self-efficacy and were less anxious of tests. Finally, teaching students to regulate their own learning was a positive predictor of studentsí task values. Our study integrates research on student motivation and teacher quality, and indicates the importance of professionalizing teachers in enhancing students to regulate their learning.

How young children succeed in learning situations: Contextual and subjective grounds

Qualitative methods,Student learning,Competencies,Primary education,Learning in context

Arttu Mykkanen, University of Oulu, Finland; Sanna Jarvela, University of Oulu, Finland;

This study investigated success that occurs in everyday learning situations in pre- and primary school educational contexts. Three different sub-studies focused on actions, beliefs and attributes that children engage in order to be successful in learning situations. In the first study childrenís resilience during a dyadic cooperative learning task performance was analyzed. The second and third study focused on childrenís views of the reasons of their own and their peersí success in authentic learning situations. Video observation, stimulated recall interviews and photo elicitation interviews were utilized as methods. The results show that not only the childrenís views of their successes are important but the contextual features that lead to it have an essential role in childrenís success. The interview data shows that children did not describe success explicitly, but rather described it through the actions that they themselves and their peers took in the situations. The reasons given for success dealt with context-specific information, such as ability to accomplish the tasks or doing academic activities in order to achieve in the task. When evaluating their peersí successes, explanations lacked the social aspects, such as sociability and comparison. The implications of designing pedagogical practices for supporting the evaluation of success are discussed.

B 14

25 August 2015 13:45 - 15:15

Room Green_A8

Paper Presentation

Researcher education

Researcher education

Keywords: Mixed-method research,Pre-service teacher education,Attitudes and beliefs,Higher education,Lifelong learning,Qualitative methods,Researcher education,Developmental processes,Doctoral education,Learning in context,Social sciences

Sig's: SIG 11 - Teaching and Teacher Education,SIG 24 - Researcher Education and Careers

Chairperson: Dely Elliot, University of Glasgow, United Kingdom

Understanding student engagement with research: A study of pre-service teachersí research perception

Mixed-method research,Pre-service teacher education,Attitudes and beliefs,Higher education,Lifelong learning

Rod Lane, Macquarie University, Australia; Penny Van Bergen, Macquarie University, Australia; Daniel Guilbert, Macquarie University, Australia;

This study investigated Australian pre-service teachersí (n = 235) engagement with research. A mixed methods approach including an online survey, standardised motivation scale, and focus group interviews was used to examine the factors influencing both engagement and disengagement with undergraduate research tasks. Attitudes towards research were found to be more positive among pre-service teachers who already possess research experience and among those who are intrinsically motivated with respect to their university studies. Extrinsic motivation did not, however, predict engagement. Implications for the effective organisation and promotion of research activities for pre-service teachers are discussed along with opportunities for future research.

Prepared and unprepared: Facets of the experiences of new doctoral supervisors

Qualitative methods,Researcher education,Developmental processes,Doctoral education,Learning in context

Gill Turner, University of Oxford, United Kingdom;

With supervision and doctoral education under increased scrutiny amid intensified international demand for well-equipped postgraduate researchers, there is a need to better conceptualise and understand the experiences of new doctoral supervisors to equip them for their role. Eleven new, UK doctoral supervisors, representing social sciences, physical sciences, humanities, and

medical sciences, were interviewed about their supervisory experiences. Two questions are addressed here: 1) In what ways do new supervisors seem prepared and unprepared for doctoral supervision? 2) What is the range of resources and help-seeking strategies used to develop as supervisors? Informed by Halse and Malfroyís five facets of doctoral supervision and an emergent thematic analysis, the findings reveal aspects of significant preparedness alongside areas requiring greater attention. Specifically, participants were passionately engaged in knowledge production within their field and were competent in teaching supervisees the required technical expertise. However, whilst caring deeply about the supervisory experience they were providing, they encountered difficulties in developing satisfactory student-supervisor relationships, and their capacity to resolve dilemmas through reflection was inhibited by a lack of contextual information. Attempts to develop as supervisors were mostly informal and ad hoc and formal mentoring relationships featured little owing to minimal engagement between the respective parties. Whilst the findings indicate specific areas for focusing support and training of new doctoral supervisors, they also suggest that institutional policies even if designed to offer supervisory support may not be a) well-enough thought through as to implementation or b) the best policy tool to achieve the intended goal.

International doctoral students at one university in South Africa - motivations and experiences

Mixed-method research,Researcher education,Social sciences,Doctoral education

Chaya Herman, University of Pretoria, South Africa;

As South Africa is aiming to become a regional hub for doctoral students from Africa, the purpose of the paper is to explore motivations and experiences of international students at one university in South Africa. It is based on a mixed methods study, which includes survey of 233 international students and in-depth interviews with students from various countries and disciplines. Interviews are on-going. 12 interviews have been conducted so far. Pull and push factors, expectations and experiences as well as economic, cultural, social and financial challenges have been identified and explored. The interviews highlight the studentsí expectations as well as their strong commitment, sacrifices and ambitions to further their education and life opportunities in the African context.

Early career researcher experience: Scholarly insights from a longitudinal mixed-methods approach

Qualitative methods,Researcher education,Developmental processes,Social sciences,Higher education,Lifelong learning

Lynn McAlpine, University of Oxford, United Kingdom; Cheryl Amundsen, Simon Fraser University, Canada;

The conceptual and methodological insights that have emerged from a longitudinal qualitative study of early career researcher experience are the focus of this paper. The research program began in 2006, was conducted in Canada and the UK, with more than 100 participants providing

data for at least 18 months and a subset for between four and six years. The goal was to examine the day-to-day experiences of early career researchers (doctoral students, postdocs and pre-tenure academics) in the social sciences and STEM sciences. Data collection tools included experience logs collected several times a year and annual interviews (incorporating visual elicitation). In order to develop a synthesis of the methodological and conceptual insights that can be drawn from the program, the two authors conducted a systematic review of the many published analyses conducted over the eight years. Conceptually, our perspective on academic identity development contributes to an understanding of the central influence of individual agency and personal lives as regards decisions related to investment in academic work and careers. Methodologically, the longitudinal narrative approach enables us to follow the individual over time and across roles. The integration of the conceptual and methodological contributions can be seen, for instance, in our ability to report how individuals have navigated their career trajectories over time and across countries, including the personal influences on their decision-making.

B 15

25 August 2015 13:45 - 15:15

Room Blue1_C1

Paper Presentation

Science education

Science education

Keywords: Quantitative methods,Teaching/instruction,Metacognition,Science education,Primary education,Inquiry learning,Assessment methods and tools,Competencies,Language (L1/Standard Language),Secondary education,Qualitative methods,Pre-service teacher education,Teacher professional development,Experimental studies,Reasoning,Informal learning

Sig's: SIG 1 - Assessment and Evaluation,SIG 11 - Teaching and Teacher Education,SIG 16 - Metacognition,SIG 26 - Argumentation, Dialogue and Reasoning

Chairperson: Aiso Heinze, Leibniz Institute for Science and Mathematics Education (IPN), Germany

Can science-related epistemic beliefs be enhanced in gifted primary school children?

Quantitative methods,Teaching/instruction,Metacognition,Science education,Primary education,Inquiry learning

Julia Schiefer, University of Tuebingen, Germany; Kerstin Oschatz, University of Tuebingen, Germany; Maike Tibus, University of Tuebingen, Germany; Jessika Golle, University of Tuebingen, Germany; Ulrich Trautwein, Institute of Education, Germany;

Science-related epistemic beliefs refer to the epistemology of science or epistemic beliefs inherent in scientific knowledge and its development. Sophisticated epistemic beliefs are required to develop an adequate understanding of science which is a normative goal of science education. Most intervention studies with a focus on the promotion of science-related epistemic beliefs have been conducted with students at the secondary school level. As there exist substantial relations between epistemic beliefs and metacognitive skills, it is assumed that gifted children, who possess high cognitive as well as metacognitive abilities, can already at class level three and four benefit from an intervention about the understanding of science with a focus on its epistemology nature. The present study investigated the effectiveness of an extracurricular course addressing the understanding of science in a randomized control group design with repeated measures. Participants were 65 children from third and fourth grade of elementary school level who were nominated by their teachers for an extracurricular enrichment program for highly gifted and gifted children in Germany. Results showed that children assigned to the intervention compared to the control condition developed more sophisticated science-related epistemic beliefs. Girls benefited more from the intervention than boys. The data provides evidence for the effectiveness of the intervention.

Language proficiency and content knowledge in physics education

Quantitative methods,Assessment methods and tools,Competencies,Language (L1/Standard Language),Science education,Secondary education

Jan Retelsdorf, Leibniz Institute for Science and Mathematics Education (IPN), Germany; Patricia Heitmann, IQB - Institute for Educational Quality Improvement, Germany; Hendrik Haertig, IPN - Leibniz Institute for Science and Mathematics Education, Germany;

Within the evaluation of national educational standards (NES) in Germany in science education all items include information required to solve an item. The idea behind this competency-oriented test design is to measure the application of content knowledge rather than content knowledge itself. However, this design might also be a threat to test validity since understanding the provided information is crucial for solving an item and studentsí language proficiency may affect the solution of these items supposed to measure physics competency. This bias may particularly be pronounced for items with open response format since here language proficiency is not only crucial for understanding the item but also for generating the answer. Thus, drawing on a sample of N = 1961 students in vocational education training, we investigated how language proficiency affects the results of the evaluation of NES. We found that NES items were to some extent related with language proficiencyóin particular open response items. In detail, there was an interaction between item format and language proficiency on the probability of a correct response in the NES tests: higher language proficiency was related to a higher probability; this effect was more pronounced for open response items. Implications for the meaning of language proficiency for the evaluation of NES will be discussed.

Impacting on teachersí learning to teach science as inquiry: Insights from a PD program

Qualitative methods,Pre-service teacher education,Teacher professional development,Science education,Primary education,Inquiry learning

Marios Papaevripidou, University of Cyprus, Cyprus; Maria Irakleous, University of Cyprus, Cyprus; Zacharias Zacharia, University of Cyprus, Cyprus;

The purpose of this study was to investigate the effect of a professional development (PD) program on teachersí development of informed views of teaching science as inquiry. Our approach drew on constructivist learning and situated cognition, built upon nine critical features of effective inquiry PD, and made use of an inquiry-based learning framework reported in the literature. The participants were 72 pre-service elementary teachers enrolled in a science methods course, within which the PD program was implemented. The course was split in 3 phases. During Phase 1, teachers as learners engaged in multiple inquiry-cycles through a designed curriculum in the context of ìboiling and peeling eggsî. During Phase 2, teachers as thinkers studied the curriculum from its pedagogical rationale, whereas during Phase 3, the teachers as reflective practitioners designed and implemented lesson plans and curriculum materials for the preparation of a student for a science fair project. Content analysis and open coding were used for analyzing the data collected from teachersí definitions of inquiry, reflective diaries, pre-and-post-assessment of teachersí inquiry skills, science fair project work, end-of-course individual interviews. The findings demonstrate that all nine critical features of effective inquiry derived from the literature were addressed in the design and were successfully implemented during the course. Additionally, a significant shift of teachers from naive to informed views of inquiry was revealed, indicating that the format and structure of the course, in conjunction with the curriculum materials and the teaching approach, significantly influenced prospective teachersí views of teaching science through inquiry.

Whom to trust and why? Disentangling the impact of personal trustworthiness on source evaluation

Experimental studies,Competencies,Metacognition,Reasoning,Science education,Informal learning

Rainer Bromme, Universitat Munster, Germany; Marc Stadtler, University of Muenster, Germany; Lisa Scharrer, University of Munster, Germany; Eva Thomm, University of Munster, Germany;

To inform personally relevant decisions laypeople increasingly have to deal with science-based information. Due to their bounded understanding they rely on the expertsí testimony and are challenged to evaluate a sourceís trustworthiness, rather than directly evaluate the veracity of claims. The present study examined the influence of source integrity and benevolence on laypeopleís evaluation of sources when handling conflicting science-based claims. The study followed a 2 x 2 repeated measurement design with the independent variables source benevolence (high vs. low) and source integrity (high vs. low). Forty university students read pairs of conflicting statements about a medical topic. The source of the first statement was described as an Online-Wiki. The source of the second statement was described as a medical doctor whose integrity and benevolence varied depending on the experimental condition. Participants subsequently rated the source regarding its credibility, integrity, benevolence, expertise and pertinence, and indicated their agreement with the sourceís statement. Participantsí attitude towards science was controlled. Benevolence and integrity manipulation had

independent effects on perceived source credibility. Sources high in benevolence/integrity were perceived to be more credible than sources low in benevolence/integrity. The effect of integrity was also translated to readersí claim agreement. Analyses suggested a moderating influence of attitude towards science on the relationship between integrity and benevolence and between benevolence and expertise. Our study represents a first step into empirically differentiating the impact of factors that may determine trustworthiness of sources. Findings will be discussed in contexts of factors that contribute to source trustworthiness.

B 16

25 August 2015 13:45 - 15:15

Room Blue2_D1

Paper Presentation

Social interaction in L&I

Social interaction in L&I

Keywords: Qualitative methods,Educational technology,Social interaction,E-learning/ Online learning,Secondary education,Reflective society,Competencies,Social aspects of learning,Social sciences,Cooperative/collaborative learning,Video analysis,Cultural diversity in school,Culture,Multicultural education,Conversation/ Discourse analysis,Teacher professional development,Early childhood education,Inquiry learning,Knowledge creation

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 21 - Learning and Teaching in Culturally Diverse Settings,SIG 25 - Educational Theory

Chairperson: Anneli Frelin, University of Gavle, Sweden

Teachers and students on Facebook: Working in online groups for a transformative learning

Qualitative methods,Educational technology,Social interaction,E-learning/ Online learning,Secondary education

Fernando Rezende da Cunha Junior, VU University Amsterdam, Netherlands; Bert van Oers, Vrije Universiteit Amsterdan, Netherlands;

The new communication tools are changing our ways of interacting with others. This is not different in the educational settings, where almost everyone is also connected to each other in a virtual space. Following this trend, the object of this study is to create an online collaborative space, where teachers and students can communicate with each other, share content and discuss what is worked in classroom, by using groups on Facebook. Those groups were formed as a way to fill the technological gap that is present in most of the schools in Brazil, were the schools do

not have technological equipment available. In addition, teachers and students used their own technological devices for this study. This study is based on Cultural Historical Activity Theory (Engestrom, 1999; van Oers, 2013; Vygotsky, 1934), which enables us to understand and reconstruct the activities involved in the research. This study is part of a bigger research project and encompasses the work of five teachers with their respective groups of students on Facebook. This is a Transformative Intervention Research (TIR), that is, based on the Critical-Collaborative studies from Magalhaes (2011). All participants are voluntary and are kept anonymous. Our findings suggest that there is an improvement of communication between teacher/students, and an improvement of interest from the students for the topics studied in classroom after the implementation of the groups on Facebook.

Project work and the grade perspective ñ A dilemma for the 21st century learner

Reflective society,Competencies,Social aspects of learning,Social sciences,Secondary education,Cooperative/collaborative learning

Anders Eklof, Kristianstad University, Sweden; Lars-Erik Nilsson, Kristianstad University, Sweden;

This paper engages in a discussion about an aspect of what it means to become a 21st century learner. Our aim is to discuss ways in which students realize their subjectivity by using a number of positions derived from the empirical material such as independent critical students, subject oriented authors and risk conscious instruction followers, all resulting from project oriented education. The empirical material consists of approximately 60 hours of filmed group interactions collected over a period of three years in a Swedish upper secondary school during a period of three years. The material are analyzed with content categorization and interaction analysis Four different positions regarding approaches towards instructions, the assessed situation and the use of different cues were identified and used to discuss how different approaches to risk forms as us citizens. In our study, positions have been derived using Goffmanís frame theory and takes a stand in Becker, Geer, & Hughes and Miller & Parlettís classical studies on assessment. The four positions describe different types of relations towards the demands of 21st century learners. The positions have been scrutinized with the aid of Beckís ìmanufactured uncertaintyî and the emphasis that Biesta puts on trust and resistance in the educational relation. We conclude that today/s students cannot effort to be cue deaf and are expected to be cue choosing facing the danger of making incorrect choices.

Assessing intercultural sensitivity: A narrative plot analysis of study abroad studentsí video-logs

Qualitative methods,Video analysis,Cultural diversity in school,Culture,Social interaction,Multicultural education

Alessio Surian, Universita degli Studi di Padova, Italy; Christian Tarchi, University of Florence, Italy; Colette Daiute, CUNY, United States;

Study abroad programmes may trigger various learning experiences: exploring a different culture, interact with new ways of thinking and behaving, improving cross-cultural knowledge and skills. However, international students have also unique needs, and if host institutions fail at addressing them, students might feel disappointed, unfulfilled. Thus, it is important to address students' adaptation process, which in the short-term can be the source of significant stress. One of the most applied models to describe and to assess adaptation to different worldviews is the developmental model of intercultural sensitivity, DMIS (Bennett, 1993). In this study, we explore differences in the way students narrate their cultural experiences and how such narratives relate to their intercultural sensitivity. The study involves twenty-eight U.S. students participating into an American study abroad programme in Italy, as well as thirty-four international students participating into an Erasmus Mundus master programme in Italy. Each student filled the Vancouver Index of Acculturation (Ryder et al., 2000) and the Acculturation Index (Ward & Kennedy, 1994), and was asked to produce a 2-minute video-log in which he/she had to discuss a cultural incident that had happened to him/her. Video-logs were transcribed and a Narrative Plot Analysis (Daiute, 2014) was applied to them. Data are presented and discussed in relation to the existing theories on intercultural competence, highlighting potential implications for higher education institutions.

The role of participation frameworks, in whole class interaction, for the construction of knowledge

Conversation/ Discourse analysis,Teacher professional development,Social interaction,Early childhood education,Inquiry learning,Knowledge creation

Albert Walsweer, University of Groningen, Netherlands;

In an ethnographic research project of 3 years in five Primary Schools, we tried to create a knowledge building environment (Bereiter, 2002; Walsweer, 2011) by introducing inquiry learning projects for the students. We found a variation in participation frameworks (Goffman, 1981) during the episodes of whole class interaction and characterized four different types of participation frameworks: monologic (1), restricted interactive (2), dialogic (3) and discussion framework (4). It turned out in the analysis that each of these participation frameworks play a specific role in the learning process and in the construction of a knowledge building environment. In this paper we investigate the following questions: 1. What are the features of the four different participation frameworks in whole class interaction? 2. How do these participation frameworks relate to the construction of a knowledge building environment and to the process of knowledge construction itself. In the end we will discuss the importance of teacher awareness of the function of participation frameworks in the process of knowledge building.

B 17

25 August 2015 13:45 - 15:15

Room Brown_B3

Paper Presentation

Teacher professional development

Keywords: Quantitative methods,Pre-service teacher education,Literacy,Language (L1/Standard Language),Higher education,Motivation and emotion,Teacher professional development,Self-efficacy,Language (Foreign and second),Early childhood education,Knowledge creation,Case studies,Comparative studies,Qualitative methods,Developmental processes

Sig's: SIG 11 - Teaching and Teacher Education,SIG 9 - Phenomenography and Variation Theory

Chairperson: Alfredo Bautista Arellano, Nanyang Technological University , Singapore

Pre-service teachers as engaged readers?

Quantitative methods,Pre-service teacher education,Literacy,Language (L1/Standard Language),Higher education,Motivation and emotion

Ietje Pauw, Katholieke Pabo Zwolle, Netherlands; Wenckje Jongstra, KPZ University of Applied Sciences, Zwolle, Netherlands; Annelot Adolfsen, University of Twente, Enschede, Netherlands;

This paper reports on a recent study that focused on the reading characteristics of pre-service teachers. The study is based on the work of Stalpers (2005, 2006), who investigated the reading characteristics of high school adolescents. Besides reading habits, five variables that appear to be related to reading frequency were investigated: i) reading motivation, ii) personality (fantasy proneness and need for cognition), iii) self-efficacy in reading proficiency, iv) reading climate (peers, parents, school) and v) perceived opportunity. A group of 350 students from the first, second, third and fourth year of one pre-service teaching program filled in an elaborate questionnaire. The results replicated Stalpersí findings in that the aforementioned five variables were also related to reading frequency of pre-service teachers. In addition, it was found that training year played an important role within the variable reading climate with respect to peers and school. These findings will inform transitions towards a curriculum in which pre-service teachers are optimally supported in their development towards engaged readers and reading promoters.

In what ways can Learning study contribute to the synergy between teaching, learning and research

Teacher professional development,Self-efficacy,Language (Foreign and second),Early childhood education,Knowledge creation

Wai Ming Cheung WM, The University of Hong Kong, Hong Kong; Yue Zhu, The University of Hong Kong, Hong Kong;

Background: In an era of high stakes accountability, language teachers struggle to improve teaching and learning Chinese for non-Chinese speaking (NCS) students. An effective professional development, learning study, was developed to support these teachersí collaborative learning on a continuous and interactive basis. At a deeper level, university experts and kindergarten teachers worked together to experience the synergy between teaching, learning and research. Aims: This study explores the characteristics and effectiveness of employing learning study approach on teaching self-efficacy and its effect on teaching and learning Chinese as a second language. Methodology: A total of 74 teachers from 20 kindergartens who joined the University-school Partnership scheme of enhancing Chinese learning for NCS learners were recruited. Teachers were given a validated Chinese Culturally Responsive Teaching Self-Efficacy Questionnaire and the Effect on Teaching and Learning Questionnaire to evaluate their teaching self-efficacy and effectiveness with formal consent before at the beginning and after the academic year. Results: It was found that the total score of the CRTSE of these teachers had a significant increase from 67.71 (S.D.=8.51) to 74.18 (S.D.=8.26) (t=2.98, p.01). The vast majority of participants agreed that this model have significant impact on teaching and learning. Significance: Learning study can be regarded as use-inspired basic research which has challenged the traditional view of the dichotomy between basic research and applied research. It has bridged the theory-practice gap by involving teachers as researchers to capture the relationship between what is happening in the classroom and the studentsí learning.

Types of professionalization of young primary teachers

Case studies,Comparative studies,Qualitative methods,Pre-service teacher education,Teacher professional development,Developmental processes

Julia Kosinar, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland; Emanuel Schmid, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland; Nicole Diebold, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland;

For some years qualitative educational research has focused on the reconstruction of developmental processes in various occupational-biographical phases (Hericks 2006, Dietrich 2011, Pille 2012). The project ìChallenges for future and beginning primary teachersì (PH FHNW 2014-2017) pursues the goal to identify the process structure of professionalization during traineeship/after career entry in relation to specific personal development. The case reconstructions are based on the theory of experiential learning (Combe 2010) which allows tracing the steps from perceived critical incidents through to their (eventual) solutions. The longitudinal study investigates on the professional development of teacher trainees/young professionals (the data collection begins shortly before graduation and ends approximately 18 months later). The empirical data is collected by guided and narrative-generating interviews at three different points in time and the analysis is carried out by means of the "documentary method" (Bohnsack 2010, Nohl 2012). The goal of the analysis is to identify types of professionalization in longitudinal section along diverse dimensions that were found in the data. Our case reconstructions point towards clear divergences in regard of professional self-image, development-orientation and use of social resources. Based on the results of the first data collection period (n = 25) our presentation reveals three contrastive types of professionalization

(Active creation, Avoidance and Adaption) and validates their compatibility with comparable studies (Rauin & Meier 2007, Dickhauser et al. 2007, Kosinar 2014).

B 18

25 August 2015 13:45 - 15:15

Room Brown_B6

Paper Presentation

Technology integration

Technology integration

Keywords: Experimental studies,Educational technology,Problem solving,Technology,Higher education,Computer-assisted learning,Quantitative methods,Attitudes and beliefs,Interdisciplinary,School effectiveness,Achievement,Mathematics,Secondary education,Qualitative methods,Video analysis,Teaching/instruction,Knowledge creation

Sig's: SIG 7 - Learning and Instruction with Computers

Chairperson: Anna Serbati, University of Padova, Italy

The effects of field dependence-independence on learnersí performance and computer interactions

Experimental studies,Educational technology,Problem solving,Technology,Higher education,Computer-assisted learning

Charoula Angeli-Valanides, University of Cyprus, Cyprus; Nicos Valanides, University of Cyprus, Cyprus;

The study investigated the problem-solving performance of 101 university students and their interactions with a computer modeling tool in order to solve a complex problem. Based on their performance on the Hidden Figures Test, students were assigned to three groups of field-dependent (FD), field-mixed (FM), and field-independent (FI) learners, and were instructed to use integrated-format materials and Model-ItÆ in order to solve a problem about immigration policy. Initially, it was examined whether there were differences among FD, FM, and FI learners in terms of their complex problem-solving performance. The results showed that FI and FM learners outperformed FD learners. These results corroborate the findings of previous related studies. Consequently, the authors employed educational data mining (EDM) methods in order to examine whether there were differences in the sequences of computer interactions that FD and FI learners employed during the complex problem solving process. FM learners were excluded from this analysis. The cumulative evidence from the EDM analyses clearly demonstrated that FD learners were not able to manage the complexity of the complex problem effectively, and

their sequences of actions showed how lost they were in the problem-solving space. FI learners, even though not all of them, appeared to be systematic in terms of testing hypotheses by changing the value of one independent variable at a time. Overall, FI learnersí sequences of computer actions showed that they, unlike FD learners, had a plan in mind and a strategy of how to collect data in order to solve the problem.

Determinants contributing to the use of ICT in the context of supporting individualized learning

Quantitative methods,Educational technology,Attitudes and beliefs,Interdisciplinary

Kerstin Drossel, University of Paderborn, Germany; Michael Schurig, TU Dortmund University, Germany; Birgit Eickelmann, Paderborn University, Germany; Martin Burghoff, University of Dortmund, Germany;

The acquisition of and ability to use digital media literacy skills has become one of the most crucial factors in participating in our 21st century society. At that, it not only represents an increasingly significant field of learning but equally provides a unique opportunity for individual support to the benefit of predominantly weaker students. In this context, previous research was able to detect the potential but a low degree of implementation of digital media use for purposes of individual support by the teachers. An essential first step towards increasing the use of new technologies to support individualized learning is the extraction of structural and personal factors which serve as predictors for the use of digital media by research. In this contribution a structural equation model has therefore been generated from the study ìGanz Inî. In 2013 teacher data (N>530) has been analyzed in order to determine the decisiveness of various factors with regards to the use of digital media for individual support. The results show that the teachersí attitudes play a more significant role than the material prerequisites in schools.

School level factors influencing the use of ICT in mathematics instruction ñ Analysis of PISA 2012

Quantitative methods,School effectiveness,Achievement,Mathematics,Secondary education,Computer-assisted learning

Birgit Eickelmann, Paderborn University, Germany; Julia Gerick, TU Dortmund University, Germany;

The present contribution examines school level determinants of using new technologies in mathematics instruction in secondary schools by conducting multi-level path analyses using PISA 2012 data. Firstly, through international comparison the effects of factors on the school level such as school leadership, educational strategies, teachersí attitudes and IT equipment regarding the use of ICT (information and communication technologies) are examined on the basis of data from the PISA school and student ICT familiarity questionnaire. Secondly, by further including relevant student data the effect of teaching and learning with ICT on studentsí mathematical achievement will be investigated. Aiming to explain which of the factors on the school level are essential to enhance studentsí learning, data from five countries (Australia,

Germany, the Netherlands, Norway, and Singapore) are focalized in order to identify similarities between countries as well as country-specific hindering and supporting factors on the school level. As to conditions towards using ICT in learning, results show that the relevance of determinants differs between the educational systems. The identified differences between the educational systems can presumably be explained through cultural and pedagogical differences as well as different traditions in implementing new technologies in teaching and learning contexts. As to the second strand of the paper, the examination on effects of studentsí achievement reveals that in two countries the use of new technologies has a negative impact while in the other three it becomes obvious that integrating technologies in teaching and learning has no significant effect on studentsí mathematic achievement.

In the service of: Teachersí autonomy in technology integration and knowledge building

Qualitative methods,Video analysis,Educational technology,Teaching/instruction,Secondary education,Knowledge creation

Sarah Howard, University of Wollongong, Australia; Karl Maton, University of Sydney, Australia; Elena Lambrinos, University of Sydney, Australia;

In fast-changing ëknowledge economiesí, young people are facing new challenges of knowledge-building throughout their lives. They must be not only highly skilled but also able to quickly grasp the organising principles of diverse forms of knowledge, in order to appropriately select, incorporate, and utilise new ideas. In education today, students are expected to engage with knowledge, practice skills and develop understandings through the use of digital technologies. Therefore, teachers are expected to use these technologies in their practice. Yet how digital tools afford or constrain knowledge-building, as embodied by academic subjects in the school curriculum, is relatively unknown. In this paper, we present an initial analysis of knowledge-building in two Australian Year 7 History classrooms. From Legitimation Code Theory, a fast-growing approach for studying knowledge practices, we utilize the concept of ëautonomy codesí. These codes conceptualize actorsí latitude concerning practices and beliefs, specifically here the provenance of teachersí practices and the degree of flexibility among principles and content of disciplines. Teaching practice and digital technologies are analysed in relation to the dominant principles and content of the subject area. Teachers in the two classrooms were teaching the same History content and both using an interactive white board. However, one teacher employed a more text-based approach while the other was more image-based. Differences in knowledge-building between the two teachers were very different. The text-based approach provided more opportunity for knowledge-building. Results from this analysis will advance theoretical and professional knowledge by informing use of multimodal and digital technologies in classroom practices and student work. More broadly, this work contributes to the development of pedagogies for knowledge-building that are both subject-appropriate and technologically-enriched.

B 19

25 August 2015 13:45 - 15:15

Room Blue2_D2

Paper Presentation

Workplace learning

Workplace learning

Keywords: Social aspects of learning,Social interaction,Informal learning,Vocational education,Learning in context,Lifelong learning,Quantitative methods,Workplace learning,Teacher professional development,Reflection,Knowledge creation,Mixed-method research

Sig's: SIG 14 - Learning and Professional Development

Chairperson: Adam Lefstein, Ben-Gurion University of the Negev, Israel

Mimetic learning: Conceptions and empirical support

Social aspects of learning,Social interaction,Informal learning,Vocational education,Learning in context,Lifelong learning

Stephen Billett, Griffith University, Australia; Laurent Filliettaz, University of Geneva, Switzerland;

This paper elaborates the conceptual premises of mimetic learning (i.e. observation, imitation and action) and its attendant inter and intra-psychological foundations (Billett, 2014) by drawing on empirical accounts from studies of learning through work. It is proposed that much of the moment-by-moment learning in which humans engage in (i.e. microgenetic development) arises through mimesis. It is this process of learning that Filliettaz (2010, 2012, 2014a, 2014b) has been investigating in childcare and engineering training and work setting. Mimesis comprises observation or other forms of sensory input, and the engagement of imitative processes including practice and rehearsal of what has been observed or otherwise experienced. This process is premised upon both inter-psychological (i.e. between the person and the world beyond them) and intra-psychological (i.e. the cognitive, sensory and neural processes that mediate what is experienced). Beyond its conceptualisation, an empirical elaboration of mimetic learning at work is helpful as the moment-by-moment learning comprising microgenetic development that comprises and is realised through mimetic processes is difficult to empirically appraise. However, the use of video and interaction analyses of visual imagery together with utterances provides a vehicle to understand and nuance these processes reliant on imputation rather than evidence. Such analyses elaborate the roles of individualsí dispositions, epistemological beliefs and epistemologies, and findings about how these interact with the suggestions arising from the social and physical environment. Procedurally, an evidence-based account of mimetic learning can assist our understanding of learning through everyday activities and interactions albeit in educational, work or other settings.

Facilitative conditions for apprenticesí informal learning activities at the workplace

Quantitative methods,Informal learning,Vocational education,Workplace learning

Gerhard Messmann, University of Regensburg, Germany; Regina H. Mulder, University of Regensburg, Germany;

The aim of this study was to investigate facilitative conditions for informal learning activities at the workplace in the context of dual vocational education programmes. Different types of informal learning activities which serve different purposes, i.e., analysing conditions, using experiences, gathering information, and generating ideas, were distinguished. This issue was addressed in a study with 70 apprentices in two technical production companies. Specifically, we investigated whether apprentices were more engaged in informal learning activities at the workplace if school-based and work-based learning processes were mutually building on each other (i.e., schoolñwork fit) and if work conditions were sufficiently complex, providing autonomy, and supportive of apprenticesí needs. By applying path modelling we found that schoolñwork fit enhanced informal learning activities carried out to gather information. Furthermore, work complexity, work autonomy, and needs support complemented each other in facilitating apprenticesí engagement in all types of learning conditions under investigation. As a consequence, vocational colleges and companies should increase the level of schoolñwork fit within dual vocational education programmes by making the importance of both learning sites for effective vocational education transparent. Specifically, this can be accomplished by using real work tasks in vocational colleges and by emphasizing in companies how school-based learning facilitates the accomplishment of work tasks. Furthermore, companies should design work environments which challenge and empower apprentices to learn as well as recruit instructors who are capable of supporting apprentices in their needs.

Reflection as a facilitator of educatorsí innovative work behaviour

Quantitative methods,Teacher professional development,Reflection,Workplace learning,Knowledge creation

Gerhard Messmann, University of Regensburg, Germany; Regina H. Mulder, University of Regensburg, Germany;

The aim of this study was to investigate the role of reflection as a preparatory mechanism for employeesí engagement in innovative work behaviour (IWB). This issue was explored in a study with 67 school educators at the highest level of German secondary education. Specifically, we investigated whether educators who reflected on work tasks, the social context, and their work performance were more engaged in the exploration of opportunities for innovation as well as the generation, promotion, and realization of innovative ideas. By applying path modelling, we found that work-related reflection facilitated all dimensions of IWB: Educatorsí IWB most strongly depended on their performance reflection. Also, reflecting on work tasks and the social context affected educatorsí IWB indirectly by benefitting their performance reflection. As a consequence, reflection should be worshipped as resource for innovation and professional

development as well as a vital component of work routines, organizational cultures, and job training.

The impact of help seeking relations in the workplace on performance

Mixed-method research,Social interaction,Informal learning,Workplace learning,Lifelong learning

Janine van der Rijt, Erasmus MC, Netherlands; Margje W.J. van de Wiel, Maastricht University, Faculty of Psychology and Neuroscience, Netherlands; Piet Van den Bossche, University of Antwerp, Belgium; Mien Segers, Maastricht University, Netherlands; Wim Gijselaers, Maastricht University, Netherlands;

Facing the dynamics of todayís workplace, help seeking is seen as an important strategy to continue to learn and develop. A general belief is that help seeking positively affects performance. However, surprisingly little empirical research exists on this topic, and studies show mixed results. Drawing on a social network approach, this study explored the impact of help seeking within employeesí networks on performance. Based on expertise research, an in-depth analysis of answers on representative case assignments was used to measure performance, in terms of accuracy of analysis, quality of explanations and conciseness of answers. Data were collected from 84 employees in financial functions, working in various (inter)national companies. Findings showed that the size of employeesí network and the usefulness of the provided help were positively related to performance, both the likelihood and frequency of help seeking were negatively related to performance. Implications of these findings are discussed.

B 20

25 August 2015 13:45 - 15:15

Room Purple_H2

Paper Presentation

Writing

Writing

Keywords: Content analysis,Teaching/instruction,Literacy,Interdisciplinary,Primary education,Communities of practice,Quantitative methods,Student learning,Writing/Literacy,Design based research,Teacher professional development,Professions and applied sciences,Higher education,Integrated learning,Social interaction,Language (Foreign and second),Science education

Sig's: SIG 12 - Writing

Chairperson: Rui Alexandre Alves, University of Porto, Portugal

Content, voices, and writer positions in studentsí written informational texts in early school years

Content analysis,Teaching/instruction,Literacy,Interdisciplinary,Primary education,Communities of practice

Caroline Liberg, Uppsala University, Sweden;

In curriculum studies more extended ways of teaching and learning have been discussed in later years in terms of fostering critical and reflecting citizens. When it comes to writing, formal aspects in early school years have traditionally dominated the instructions. The purpose of this study is to broaden this perspective and develop ways to investigate content, studentsí voices, and writer positions in writing in early school years. The study is based on a social semiotic perspective. Data consists of 276 informational texts in Science and Social Science written by students in grade 2 and 3 in two different Swedish schools. Preliminary results show four categories of texts: * Texts where dominant disciplinary claims are focused, characterized by an ìEncyclopedic voiceî, and an impersonal writer position. * Texts with a combination of dominant disciplinary claims, more general circumstances, and personal experiences, characterized by a ìPersonalized encyclopedic voiceî, and where the writer position varies between impersonal and personal. * Texts with a combination of dominant disciplinary claims, more general circumstances, and perspective/s on the content, and characterized by an ìEncyclopedic voice with perspectivesî. * Texts with a combination of dominant disciplinary claims, more general circumstances, perspective/s on the content, and the design of the future, and characterized by an ìEncyclopedic voice with perspectives, and design of the futureî. The writer position varies between an impersonal and a personal and critical in these two last categories.

The influence of phonological awareness on text quality in Grade 1

Quantitative methods,Student learning,Literacy,Writing/Literacy

Anja Kuerzinger, Universty of Bamberg, Germany; Sanna Pohlmann-Rother, University of Education Ludwigsburg, Germany; Caroline Theurer, Institute for Educational Sciences, Germany;

Although the importance of phonological awareness for reading and writing skill development is well-documented, there are no results regarding its influence on the quality of studentsí writings in elementary schools. Therefore the German study NaSch1 (ìNarrative Writing Skills in Class 1î) focuses on narrative writing skills in the first school year. One issue is to examine the influence of phonological awareness on text quality in grade one. The quality of the texts, which were written in the middle of the first school year, was evaluated both holistically and analytically on the basis of a criteria catalog. At the beginning of grade one, the subtest ìAnlaute horen und Laute sprechenî (hearing initial sounds and speaking sounds) (ÑLern- und Entwicklungsstand bei 4- bis 7-Jahrigenì, Moser, Berweger & Luchinger-Hutter, 2004) was used, whereas for the assignment of letters to sounds, the subtest ìBuchstaben lesenî (reading letters) was used. The analyses of text quality show that texts written by novices can undergo a detailed content analysis and first graders are capable of improving functional and pragmatic

writing skills. The study found that the aspects of phonological awareness had a weak effect on text quality. In this context, the studentsí social background (HISEI), intelligence and also the composition of the studentsí class were taken into consideration.

Preparing a genre-based writing intervention for the first year of higher professional education

Design based research,Teacher professional development,Professions and applied sciences,Writing/Literacy,Higher education,Integrated learning

Cindy Kuiper-Nijland, Saxion/KU Leuven, Netherlands; Jantien Smit, Saxion University of Applied Sciences, Netherlands; Lieve De Wachter, ILT/K.U.Leuven, Belgium; Jan Elen, KU Leuven, Belgium;

Writing is a challenge for many students entering higher education. Within a larger design-based research (DBR) project, the aim of this study is to investigate first-year studentsí writing needs and subject lecturersí current approaches to writing instruction so as to inform a genre-based writing intervention (GBWI). 86 students and 35 subject lecturers participated in this L1-research, conducted at an institution for higher professional education in the Netherlands. We collected data by means of questionnaires and interviews, which were partially informed by the teaching-learning cycle that is used as a design heuristic within genre-based approaches. Data on studentsí writing needs and lecturersí writing instruction were analyzed statistically through SPSS (questionnaires) and coded on content (interviews). Results confirmed that many students face writing difficulties, more particular with both lower and higher order writing skills. Writing style seemed to be a main obstacle, which students especially encounter when they write research and business reports. Furthermore, students need subject lecturersí guidance, as they often do not know what is expected of them. Regarding subject lecturersí approaches to writing instruction, we found that many do not have insight into studentsí writing process, do not make their expectations explicit, and do not give feedback during the writing process. These results were translated into guidelines to inform the intervention with the help of an analytic instrument. The significance of this study lies in the DBR approach of preparing a GBWI, which provided us with valuable insights that are needed to attune the intervention to the specific context.

Predicting the effectiveness of L2 writers peer feedback in a web-based peer review system

Social interaction,Language (Foreign and second),Science education,Writing/Literacy,Higher education

Djuddah Leijen, University of Tartu, Estonia;

The use of peer feedback to support the development of student writing is now generally accepted among second language writing teachers and researchers. However, certain aspects of peer feedback remain controversial; in particular, there remain questions about how peer feedback should be organized for second language writing tasks and the effects that different peer feedback modes might have on students writing. This paper addresses these questions by studying the use of a web-based peer-review system amongst second language writers. In order

to investigate the effectiveness of this system, this study uses machine learning methods to predict the effectiveness of specific peer feedback features. The effectiveness of peer feedback is measured by noting whether a peer feedback instance leads a student to make specific changes in their text or not. The results of this study indicate that peer feedback is effective if feedback instances propose specific alterations and if more than one peer makes a reference to a similar aspect in the text that needs changing. It is further argued that the method chosen for the study makes the analysis of different datasets more accessible and should offer better insights into peer feedback on L2 writing in subsequent research.

B 21

25 August 2015 13:45 - 15:15

Room Orange_E1

Paper Presentation

Workplace learning

Young children' s mathematics learning and adults' learning

Keywords: Quantitative methods,Competencies,Vocational education,Workplace learning,Student learning,Peer interaction,Secondary education,Cooperative/collaborative learning,Mentoring in teacher education,Pre-service teacher education,Reflection,Communities of practice,Case studies,Qualitative methods,Numeracy,Primary education,Knowledge creation

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 11 - Teaching and Teacher Education,SIG 14 - Learning and Professional Development,SIG 5 - Learning and Development in Early Childhood

Chairperson: Dagmar Festner, University of Paderborn, Germany

Vocational competencies made visible - Measuring tomorrowís potential at the workplace

Quantitative methods,Competencies,Vocational education,Workplace learning

Esther Winther, German Institut for Adult Education, Germany; Dagmar Festner, University of Paderborn, Germany; Viola Klotz, University of Paderborn, Germany; Julia Sangmeister, University of Paderborn, Germany;

The paper discusses central topics of a competence measurement approach in the fields of vocational education and training (VET). To focus on professional competencies at the workplace is strongly linked to the increasing importance of knowledge and skills within work processes, and the progressive use of information and communication technologies. The discussion of competencies at work began decades ago (Mertens, 1974; Buttler, 1992, 2009; Achtenhagen, Nijhof, & Raffe, 1995; Achtenhagen & Grubb 2001; see also Winterton, 2009)

and led on the political level to the EU declarations of Lisbon and Copenhagen. In this particular context the paper presents ways of assessing vocational and professional competencies on the micro-level in an objective, reliable, and valid way. These desiderata are part of the international research initiative CoBALIT (Competencies in the Field of Business and Administration ñ Learning, Instruction, and Transition) funded by the German Federal Ministry of Education and Research (BMBF).

Actor and partner effects of student characteristics on learning outcomes in cooperative learning

Quantitative methods,Student learning,Peer interaction,Secondary education,Cooperative/collaborative learning

Katrin Hochdoerffer, University of Koblenz-Landau, Germany; Caroline Verena Wahle, University of Koblenz-Landau, Germany; Friedrich-Wilhelm Schrader, Universitat Koblenz-Landau, Germany;

Various empirical studies underline the positive effect of cooperative learning on studentsí performance, persistence and attitudes (Hattie, 2009; Springer, Stanne & Donovan, 1999). Following Nijhofís and Kommersí model of group behavior (1985), we assume that individual characteristics of learning group members influence their learning processes and outcomes in cooperative learning settings. The correlation between individual characteristics of learning group members and performance has so far mainly been investigated during the 80ís and 90ís (Springer et al., 1999). In the majority of those studies, variables such as sex or ethical background were considered. However, other variables, which are also relevant for academic success, e.g. intelligence, personality characteristics or motivational features, have so far hardly ever been investigated in studies with dyadic settings. Thus, the present study examines group composition effects concerning studentsí self-concept, intelligence and conscientiousness in learning dyads on studentsí performance. The sample comprises 244 10th graders with a mean age of 15,6 years (SD = 0,66) and 56,1 % males and 39,3 % females. After deleting incomplete data sets, we can include 86 student dyads in the analysis. The data was analyzed using multi-level models. The results will be discussed in relation to the ìActor-Partner Interdependence Modelî (Kenny, Kashy & Cook, 2006).

How do teachers learn? Exploring reflection and learning opportunities during the induction phase

Quantitative methods,Mentoring in teacher education,Pre-service teacher education,Reflection,Workplace learning,Communities of practice

Christina Linninger, Goethe-Universitat Frankfurt, Germany; Olga Kunina-Habenicht, Goethe University Frankfurt; Institute of Psychology, Germany; Kathleen Sturmer, School of Education, Germany; Tina Seidel, Technische Universitat Munchen (TUM), Germany; Mareike Kunter, Goethe-Universitat Frankfurt, Germany;

In teacher education the induction phase is meant to support beginning teachers during their transition into practice. Typical characteristics are learning opportunities such as the interaction with an individual mentor at school as well as the aim to foster a reflective stance in beginning teachers (Beijaard et al., 2010). Drawing upon the socio-constructivist theory of learning and upon previous research on learning opportunities during the induction phase (Decker et al., 2014; Richter et al., 2013) we look more deeply into the role of reflection in the development of pre-service teachersí professional practice as well as into the effect of different learning opportunities during the mandatory induction phase in Germany. In a longitudinal sample of 362 German pre-service teachers we explored the relationship between reflectionóconceptualized as the critical analysis of oneís experiences at school as well as the modification of his or her behavioróand the pre-service teachersí instructional practice. We furthermore analyzed the effects of constructivist-oriented mentorñmentee relationships and of discussions during induction courses on pre-service teachersí reflection. Structural equation models conformed to our expectations: Reflecting on experiences was significantly related to self-assessed instructional behavior as well as to the pre-service teachersí professional vision. Moreover, the amount of reflection was predicted by constructivist-oriented mentorñmentee interaction as well as by discussionsóin contrast to a mere sharing of experiencesóduring induction courses. The findings imply suggestions for the development of effective elements in induction programs.

The reification of childrenís oral counting in 2s through the lens of Representational Redescription

Case studies,Qualitative methods,Student learning,Numeracy,Primary education,Knowledge creation

Chronoula Voutsina, University of Southampton, United Kingdom;

In childrenís numerical development counting develops into an increasingly abstract endeavour. Oral counting forwards and backwards in steps of 2, 5 and 10 and the ability to continue counting from any point of the counting sequence is a skill that is encouraged in primary education as it supports the development of partitioning strategies for addition and subtraction and can help childrenís learning of multiplication. It has been proposed that the development of childrenís increased in sophistication counting is the result of a ëreification cycleí or refinement of the counting process with which children begin to see and use numbers as mathematical objects. As a result, initial counting procedures are compressed and used as a calculation strategy. This paper proposes that the reification of verbal counting in steps bigger than 1 is underlaid by the process of knowledge explicitation that Karmiloff-Smithís theory of Representation Redescription (RR) postulates. Key points of the theoretical discussion are illustrated by qualitative data drawn from a case study. Indicative episodes of dialogue between a 6-year-old child and her mother as they practiced oral counting in steps of two allow the tracking of changes that marked the reification of the particular oral counting sequence. The paper concludes that the theory of Representational Redescription can be used as a useful theoretical lens to account for conceptual changes occurring in the learning of counting sequences.

25 August 2015 13:45 - 15:15

Room Cyan_F2

Paper Presentation

Early childhood education

Early childhood education, attitudes, SRL and motivation

Keywords: Teaching/instruction,Goal orientation,Secondary education,Motivation and emotion,Experimental studies,Developmental processes,Literacy,Early childhood education,Quantitative methods,Attitudes and beliefs,Language (L1/Standard Language),Mathematics,Primary education,Student learning

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 11 - Teaching and Teacher Education,SIG 5 - Learning and Development in Early Childhood,SIG 8 - Motivation and Emotion

Chairperson: Bracha Kramarski, Bar-Ilan University, Israel

Creating a mastery-oriented climate in the classroom: teacher motivation and goals structures

Teaching/instruction,Goal orientation,Secondary education,Motivation and emotion

Marjon Fokkens-Bruinsma, University of Groningen, Netherlands; Esther Canrinus, University of Groningen, Netherlands;

This study focuses on the question of how teachers enhance their students' achievement motivation through the goals they set in their classroom. Research shows that the goals students set for themselves can be influenced by the type of goals set by teachers in their classroom. In mastery-oriented classrooms both peers and teachers focus on attainment and competence by trying to improve and develop, starting from their own individual capabilities. In performance-orientated classrooms, attainment and competency by social comparison and in competition with peers is emphasized. Our assumption is that creating an optimal motivational classroom, i.e. a mastery-oriented classroom, is beneficial for studentsí achievement motivation as this type of environment promotes learning and motivation. In practice, a performance-oriented classroom is more easily (and more commonly) promoted than a mastery-oriented classroom. Data was collected within five secondary schools in the Northern region of the Netherlands. 151 teachers completed a digital questionnaire on their goals and motivation. Analyses showed that teachers scored higher on autonomous motivation than on controlled motivation. Furthermore, teachers more often created a mastery-orientated climate than a performance-oriented climate. The analyses also indicated that teachers with high controlled motivation were more likely to promote performance-goal structures and teachers with high autonomous motivation promoted mastery-goal structures more often. Our study provides us with information on what motivates

teachers in pursuing their work and informs us how to create a mastery or performance classroom goal structure.

Improving preschoolersí phonological awareness with music and phonological training

Experimental studies,Developmental processes,Literacy,Early childhood education

Sebastian Kempert, Humboldt-Universitat zu Berlin , Germany; Kristine Blatter, University of Bamberg, Germany; Catharina Tibken, University of Wuerzburg, Germany; Regina Gotz, University of Wuerzburg, Germany; Petra Stanat, Humboldt Universitaet Berlin, Germany; Cordula Artelt, Bamberg Unversity, Germany; Wolfgang Schneider, University of Wuerzburg, Germany;

The present study investigates the effects of two intervention programs designed to foster phonological awareness (PA) in preschoolers. More precisely, a musical and a phonological training of PA were subsequently applied to an experimental group within a period of 2 years. This group was compared to a second experimental group which only took part in the phonological training as well as to a control group which did not receive any specific treatment. The study is based on the assumption that in the early years of human development, musical and verbal input share the same basic sound category learning mechanisms (Patel, 2008). Thus, both linguistic and musical contents can be used to train PA. In the present study we want to find out if the subsequent combination of musical training and phonological training shows incremental effects on PA development. Multivariate analyses revealed that both training programs enhanced certain language competencies. Whether the combination of both programs shows an incremental effect on PA and whether this holds true for children with special language needs is subject of present analyses. Both programs can be implemented in everyday kindergarten settings. Therefore, they can be seen as valuable components of a repertoire aimed at training important precursor skills of literacy development.

Effects of teacher and parent expectations on achievement development before school transition

Quantitative methods,Attitudes and beliefs,Language (L1/Standard Language),Mathematics,Primary education,Secondary education

Edith Niederbacher, University of Applied Sciences and Arts Northwestern Switzerland FHNW, Switzerland; Stephan Rosselet, FHNW School of Education, Switzerland; Markus Neuenschwander, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland;

Research about institutional effects on students' achievement development revealed that the gain in competence in lower secondary education depends on the specific learning environment of different school tracks. Additionally, social interactions between teachers, parents and students, i.e. teacher and parent expectations regarding the child's academic achievement, strongly influence students' academic achievement. In the present study we investigate whether teacher expectations of students' future school tracks influence the achievement development in German

and mathematics during the transition from primary to lower secondary education (5th to 7th grade). Furthermore, we examine whether the effect of teacher expectations of students' future school tracks on academic achievement is mediated by concrete achievement expectations of parents. The longitudinal study "Effects of Tracking" compared students' achievement development in German and mathematics from 5th to 7th grade between two groups (transition after 5th grade, N=212, and transition after 6th grade, N=386) in Switzerland. Students completed achievement tests. Teacher school track expectations and parent achievement expectations were measured by standardized questionnaires. Results of multiple stepwise regression analyses showed that teacher expectations of future school tracks influenced students' achievement development in German and mathematics. Furthermore, the effect of teachers' school track expectation is fully mediated by parent expectations of achievement. The present study contributes to the discourse on the effects of social interaction and expectations of students' achievement development.

Investigating the role of personality and learning context for middle school students' motivation

Quantitative methods,Student learning,Teaching/instruction,Mathematics,Secondary education,Motivation and emotion

Barbara Otto, Goethe-Universitat Frankfurt, Germany; Natalie Vannini, University of Frankfurt, Germany;

Many studies revealed that there exists a strong association between students' motivation and academic performance in mathematics. However, little is known about the particular determinants of students' motivation. Basing on Self-Determination Theory (Deci & Ryan, 1985; 2000) the current study aimed at investigating which impact students' personality (research question 1) and the perceived learning context (research question 2) has on middle school students' autonomous and controlled motivation. The third research question addressed whether or not the perceived learning context can significantly predict students' motivation after controlling for students' personality. Self-reported data were collected of 795 students. Regression analyses were conducted in order to answer the research questions. The results indicate that personality as well as perceived learning environment were significant predictors of students' autonomous motivation in mathematics ($R \leq .27$ and $R \leq .12$, respectively) but hardly accounted for any variance in controlled motivation ($R \leq .05$ and $R \leq .01$, respectively). Moreover, the perceived learning environment was still a significant predictor for students' autonomous and controlled motivation even after controlling for personality, indicating that teachers do have a decisive role in the development and maintenance of students' motivation in mathematics.

B 23

25 August 2015 13:45 - 15:15

Room Green_A4

Paper Presentation

Teacher professional development

Teacher professional development and technology enhanced learning

Keywords: Mixed-method research,Technology,Out-of-school learning,Computer-assisted learning,Quantitative methods,Pre-service teacher education,Competencies,Higher education,Teacher professional development,Attitudes and beliefs,Developmental processes,Social sciences,Mathematics,Secondary education

Sig's: SIG 11 - Teaching and Teacher Education,SIG 7 - Learning and Instruction with Computers

Chairperson: Grete Arro, Tallinn University, Estonia

Bringing computational thinking to middle school: A school-university partnership

Mixed-method research,Technology,Out-of-school learning,Computer-assisted learning

Chrystalla Mouza, University of Delaware, United States; Yi-Cheng Pan, University of Delaware, United States; Partner4CS Team, University of Delaware, United States;

In this study we present an after-school program focusing on game design with Scratch, developed through a strong partnership of university faculty, teachers, students and computer science undergraduates engaged in a service-learning course. We subsequently explore the potential of game design to promote computational thinking at the middle school level. Findings indicate that game design helped students acquire computational thinking concepts supported by Scratch. Pre and post assessment demonstrated significant gains in students' learning. Further, game design helped students understand better the game design process. Findings of this work illustrate the importance of school-university partnerships in supporting students' computational thinking.

Beginning teacher students: Their motives and the requirements they face

Quantitative methods,Pre-service teacher education,Competencies,Higher education

Carla Bohndick, University of Paderborn, Germany; Susanne Kohlmeyer, University of Paderborn, Germany; Heike M. Buhl, University of Paderborn, Germany;

Recent research on teacher education has been trying to find points for improvement. For changes in teacher education it is necessary to take a look at the conditions with which the preservice teachers start and requirements they face. Two studies were conducted each focusing a different perspective: The first study analyzed motives for choosing teaching as a career by surveying 907 high school students from which 463 students could imagine becoming a teacher and were included in the analyses. The main findings of SEM analyses indicate that, overall,

students who were less sure about their career choice tended to rate their motives lower. Furthermore gender differences and relationships between social competency and motives were discovered. The second study identified study requirements in teacher education by applying the method for analyzing the demands of university studies (MEVAS; Hell, Ptok & Schuler, 2007) and relates them to five criteria for academic achievement. Therefore 686 students from an averagesized German university rated several requirements regarding the personal degree of fulfillment. Factor and regression analyses resulted in 6 meaningful dimensions of requirements: self-discipline, coping strategies, interest, use of services, cognitive abilities, and combination of theory and practice. Implications of both studies are discussed.

A longitudinal study of development of the professional identity of student teachers

Mixed-method research,Teacher professional development,Attitudes and beliefs,Developmental processes,Social sciences,Higher education

Katrin Poom-Valickis, Tallinn University, Estonia; Erika Lofstrom, University of Helsinki, Finland;

The current paper is based on interviews (N=13) carried out in the end of a longitudinal study. We present an overview of the development of the professional identity of student teachers who have finished a five-year long teacher training program. The aim of the study was to examine the meanings and beliefs behind student teachersí teacher identities that have been formed in interactions with the surrounding learning environments, including the experiences from their studies at the university. As memory enhancers we used metaphors that the students had provided during their studies, and also data from earlier data collections during their first, third and fifth study year. Most teacher education entrants initially have a naive understanding of teaching which is often based on their own school experience. Analysis of the prospective subject teachersí ideal descriptions shows that the subject matter expertise plays an important part in the development of their professional identity. By contrast, the prospective class teachers were focused on their relationship with pupils and the comprehensive learning process. These ideals change together with understandings and values as experiences are gained, including those while studying. Analysis of the metaphors and interviews indicated that the student teachersí understandings of the teacherís role had become more complex and diverse during the studies. Comparing the results of cluster analysis and interviews, certain attributes seemed to appear in repeating patterns on which basis four profiles in terms of teacher identity formation were distinguished.

Teachersí diagnostic competence of achievement, work habits, and social behavior

Quantitative methods,Teacher professional development,Competencies,Mathematics,Secondary education

Justine Stang, University of Passau, Germany; Detlef Urhahne, University of Passau, Germany;

The study aimed to examine the accuracy of teachersí judgments of studentsí mathematics achievement, work habits, and social behavior. Furthermore, it uncovers the changeability of

teacher judgment over time and variables influencing accuracy. At both points of measurement, 17 mathematics teachers judged 294 fifth-graders. At the end of the first and second school term, students dealt with a standardized mathematics test and completed a self-description questionnaire on work habits and social behavior. Teachers were asked to make predictions of the same characteristics. Results of both points of measurement showed that teachers were more accurate in judging achievement than work habits and social behavior. A significant improvement of their diagnostic competence could only be revealed for achievement. Multilevel modeling with HLM showed for the first point of measurement that teachersí age, gender, and work experience had no influence on the accuracy of teachersí judgments. At the second point of measurement, a significant influence of gender was detected for social behavior. Female teachers predicted empathy significantly better than males. The results are discussed in terms of content and methodological issues, while implications for research and practice are presented.

B 24

25 August 2015 13:45 - 15:15

Room Brown_B7

Paper Presentation

Emotion and affect

Emotion and affect and motivation

Keywords: Quantitative methods,Student learning,Emotion and affect,Self-efficacy,Secondary education,Motivation and emotion,Learning approaches,Social sciences,Higher education,Reading comprehension,Primary education,Mixed-method research,Emotion and cognition,Self-regulation

Sig's: SIG 8 - Motivation and Emotion

Chairperson: Birgit Heppt, Humboldt-Universitat zu Berlin, Germany

When I feel good I see good: Does studentsí competence affect the way they perceive their teachers?

Quantitative methods,Student learning,Emotion and affect,Self-efficacy,Secondary education,Motivation and emotion

Rinat Cohen, Ben Gurion University of the Negev, Israel; Idit Katz, Ben-Gurion University of the Negev, Israel; moran green, Ben Gurion University of the Negev, Israel;

In this study, we investigated whether students who perceive themselves as competent tend to perceive their teachers as supportive and thus, are motivated to learn and have higher wellbeing. Using the self-determination theory and the social relation model as theoretical frameworks, we

investigated a model in which differences in perceived competence predict differences in the perception of the teachers as supportive, which mediates the relation to positive motivational outcomes. Four hundred and seven ñ fifth and sixth-grade students in Israel participated in this study. Students completed questionnaires assessing their motivation to learn, their perception of their teachers as supportive, their sense of competence, and their emotions and well-being in school. The results of a path analysis indicated that students who perceive themselves as more competent tend to perceive their teachers as more supportive than students who perceive themselves as less competent, and that this mediates motivation and emotional experience in school. The results highlight the importance of understanding studentsí characteristics and their influence on studentsí perception of teachersí behavior. Knowledge about which characteristics of students affect their perception of teachers adds information about the role of teachers in studentsí motivation, beyond the known contribution of the need for a supportive environment, and can help promote studentsí adaptive motivation.

Culture of mediocrity? Identifying self-regulation strategies of first year social science students

Quantitative methods,Student learning,Learning approaches,Social sciences,Higher education,Motivation and emotion

Ron Pat-El, Open University, Netherlands; Nadira Saab, Leiden University, Netherlands; Suzan Van der Meulen, Leiden University, Netherlands;

Policy makers and politicians in the Netherlands have debated what they have termed a ëculture of sixesí among higher education students, i.e., a ëmentality of mediocrityí (MoM), wherein students are described as strategically exerting the minimum effort necessary to get passing grades. This paper aims to identify which motivational and self-regulatory factors predict identification with the MoM in students of the social sciences at Leiden University. MOM implies that despite low utilization of SR-strategies students efficaciously aim towards mediocre study-results, trusting in their ability to academically survive at the thin line between failing and passing exerting as minimal effort as possible. We hypothesize that students who identify with MoM will be self-efficacious in their ability to pass their courses, but will report low self-regulatory skills such as effort and time-management, lowly value their education and show little intrinsic motivation for studying. Ninety-five first-year students from the Faculty of Social and Behavioural sciences at Leiden University were sampled. A questionnaire measured Self-regulation (MSLQ), learning orientation (R-SPQ-2F). MoM-identification was measured by asking how much respondents identified with the statement ìI can, if I want, get higher grades, but I consciously choose to minimize the time I spent on my studyî. The results confirm the hypothesis that students who highly identify with MoM are self-efficacious of their ability to pass their courses while simultaneously exerting little effort or time in their studies. Not conform our hypotheses, however, high identifiers did not differ in their motivational orientation or task value from low identifiers.

Externalizing behaviors and learning from text in fifth graders: The moderating role of mood

Quantitative methods,Student learning,Emotion and affect,Reading comprehension,Primary education,Motivation and emotion

Sara Scrimin, University of Padua, Italy; Lucia Mason, University of Padova, Italy; Ughetta Moscardino, University of Padova, Italy; Gianmarco Altoe, University of Padova, Italy;

The ability to acquire knowledge from a written text is central to successful learning in most, if not all, academic subjects. Recent research indicates that externalizing problems and negative mood can impair reading outcomes. However, the interaction between these variables in predicting learning from text is not well understood. This study examined the moderating role of negative mood in the association between externalizing behaviors and learning from text in primary school children. Fifth graders (N=160) were randomly assigned to either a negative or a neutral mood condition. Students were mood-induced by watching a video-clip. Subsequently, they read a text, provided an explanation of the phenomenon introduced in the text, and reported on their externalizing behaviors. Ordinal logistic regression and simple slope analysis revealed that more externalizing behaviors were related to poorer learning gain in students in the negative mood condition, but not in those in the neutral mood condition. These results show that negative mood moderates the effect of externalizing behaviors on learning from text, thus giving important hints for practice in educational settings.

Emotion regulation and well-being in the primary school classroom

Mixed-method research,Emotion and affect,Emotion and cognition,Self-regulation,Primary education,Motivation and emotion

Matthew Somerville, University of Cambridge, United Kingdom;

Although emotion is central to most models of childrenís well-being, very few studies have looked at how well-being is related to the way in which children regulate their emotions. Using Grossí (1998) process model of emotion regulation, this study investigates the relations among childrenís emotion regulation strategies, their subjective well-being, and the social context of the classroom. It also examines how children with high and low levels of well-being differ in their use of emotion regulation strategies. The study was carried out in 31 classrooms across 8 primary schools situated in low socioeconomic neighbourhoods of New Zealand. In Phase 1, 504 children (mean age = 9.91) completed questionnaires on their subjective well-being, emotion regulation ability, emotion regulation strategy use, and the social context of their classroom. Based on responses from Phase 1, 33 children were selected for Phase 2, which involved interviews and video-recorded observations of emotion regulation strategy use in the classroom. Findings indicate that the social context of the classroom (including the teacher-student relationship, student autonomy, and classroom structure) is positively associated with both childrenís emotion regulation and subjective well-being. The self-report data also indicate that children who frequently use cognitive reappraisal strategy, experience more positive emotion, less negative emotion, and are more satisfied with their lives than children who use cognitive reappraisal less frequently. These findings will be discussed alongside an analysis of the emotion regulation observation data, allowing us to better understand the learning contexts and emotion regulation strategies that promote childrenís well-being.

C 1

25 August 2015 15:45 - 17:15

Room Brown_B1

Invited SIG

Research methodology

Understanding the learning process through objective, online measures (SIG 27)

Keywords: Cognitive skills,Quantitative methods,Technology

Sig's: SIG 27 - Online Measures of Learning Processes

Chairperson: Ellen Kok , Maastricht University, Netherlands

Organiser: Halszka Maria Jarodzka, Open University, Netherlands

Organiser: Ladislao Salmeron, University of Valencia, Spain

Discussant: Sanna Jarvela, University of Oulu, Finland

Learning is more than an outcome, such as a final grade or a degree; learning is an ongoing process. To better understand and improve learning it is thus, important to look at the route to these outcomes. However, learners often lack the ability to introspect on their way of learning. With the development of new technology, it is possible to observe, measure, and understand learning processes more objectively while they are happening. In this symposium, researchers who have broad, year-long experience with online measures will each present series of studies to illustrate the merits and challenges of using such measures in learning and instruction. The first two contributions (Holmqvist, Boshuizen) discuss the difficulty of finding the appropriate eye tracking indicators to capture complex cognitive processes taking place during learning. As a guideline, Holmqvist presents a methodologically inspired process model, while Boshuizen makes a plea for a conceptual model, both of with the aim to help choosing and interpreting eye tracking data. The latter two contributions (Leseman, Azevedo) discuss how different online measures can be combined to investigate key aspects of the learning process. Leseman presents studies where eye tracking or event-related brain potentials (ERPs) helped to understand the effects of scaffolding and feedback. Azevedo discusses how to use a wide range of physiological and logging measures to capture cognitive, affective, metacognitive, and motivational processes of self-regulated learning. Finally, J?rvel? will discuss what we can learn from these presentations to effectively use online measures to unfold the learning process.

Eye-tracking measures for studying the online process of learning

Experimental studies,Quantitative methods,Comprehension of text and graphics,Multimedia learning

Kenneth Holmqvist, Lund University, Sweden;

In my talk, I will present how our group in Lund and collaborators have used online measures to capture the process of learning. Taking five case studies as a starting point, and showing the diversity of measures employed, I aim to argue that there cannot be a group of eye-tracking measures for learning like there is for reading research or for clinical research. The reason that educational psychology cannot be like reading research is the large variety of stimuli and instruction in educational material. This forces educational researchers to actively shop for measures suitable to the properties of their particular study. I will conclude my talk by describing the general process of selecting the right measure for a study.

Investigating expertise development with eye-movement data: the problem of not knowing whether more

Quantitative methods,Cognitive skills,Professions and applied sciences,Higher education

Els Boshuizen, Open University, Netherlands;

The increasing availability and user-friendliness of eye-movement registration equipment has generated a host of studies in which eye-movements were used to investigate visual-cognitive processes. The larger or the more complex the cognitive component in these processes is, the more indirect the relation between eye-movement indicators and presumed information processing is. As a result simple linear relations are seldom found. Instead, comparable studies in similar domains but with slightly different task characteristics or different groups may lead to contradictory results that cannot be explained without a deeper understanding of a) the nature of professional vision in a specific domain, especially when the visual material is an artificially constructed representation of ëinvisibleí processes and structures by methods such as microscopy, fMRI, radiology; b) the task itself and how it is affected by task authenticity, c) how cognitive restructuring (differentially) affects all levels of information processing. In this contribution Iíll present contradictory findings form a variety of fields to demonstrate these points and identify some gaps in our understanding that need to be filled. A model of measurement of professional vision will be presented.

Using online neurocognitive measures to examine core concepts in education and learning

Experimental studies,Quantitative methods,Neuroscience,Reading comprehension

Paul Leseman, Utrecht University, Netherlands;

Using experimental research paradigms with online measures of processing, such as eye-tracking and ERPs, derived from cognitive (neuro)science, can contribute importantly to theory building in the educational and learning sciences. To illustrate the possibilities of online measures, the present paper will focus on two core concepts in educational theory: scaffolding and feedback.

Although studies have indicated that particular teaching strategies, such as providing instruction that is contingent on studentsí current learning and feedback that is constructive and task-related, are more effective in producing learning outcomes than other strategies, it is still unclear how these strategies influence studentsí cognitive processing in learning situations. Most research in this area is either qualitative-interpretative, focusing on educational dialogues, or quantitative-correlational, finding associations between a particular teaching style and studentsí actual achievement. The pathways between teaching and learning, however, remain largely a black box. This paper discusses four experiments in which online measures were used to examine these core concepts.

Using process data to examine self-regulation with advanced learning technologies

Experimental studies,Quantitative methods,Self-regulation,Science education

Nicholas Mudrick, North Carolina State University, United States; Roger Azevedo, North Carolina State University, United States; Michelle Taub, North Carolina State University, United States;

Contemporary research on self-regulated learning (SRL) with advanced learning technologies focuses on the collection and analysis of complex, temporally-unfolding process data using various interdisciplinary methods. In our research, we have used various process measures of SRL data, including concurrent think-alouds, log-files, eye-tracking, physiological sensors, facial expressions of emotions, dialogue moves, etc. to examine the role of cognitive, affective, metacognitive, and motivational (CAMM) processes deployed both by individuals alone and between individuals (e.g., artificial pedagogical agents and learner interactions). The use of these methods yields rich, contextualized, multi-modal data (e.g., utterances of cognitive and metacognitive processes, video streams of facial expressions of emotions, text files from log-files about behavioral sequences, etc.) of temporally unfolding SRL processes, which challenge methodological approaches and traditional statistical analyses (e.g., violate statistical assumptions, unit of analyses, sampling rate, level of granularity, temporal alignment, level of description, and different time scales). These challenges pose significant problems for the advancement of research in the area of SRL. In this presentation, I will present a sample of process SRL data (from several studies) during human learning with various ALTs and discuss the methodological and analytical issues and challenges related to using multi-modal SRL data to understand learning.

C 2

25 August 2015 15:45 - 17:15

Room Brown_B2

Invited SIG

Writing

Design principles for teaching effective writing

Keywords: Achievement,At-risk students,Educational attainment,Instructional design,Teaching/instruction,Writing/Literacy

Sig's: SIG 12 - Writing

Chairperson: Vince Connelly, Oxford Brookes University, United Kingdom

Organiser: Raquel Fidalgo, University of Leon, Spain, Spain

Organiser: Martine Anne H. Braaksma, University of Amsterdam, Netherlands

Discussant: Vince Connelly, Oxford Brookes University, United Kingdom

Meta-analyses about writing instruction have suggested strategy-oriented programs are more effective than other types of instruction for improving writing. A large body of strategy-focused research has emerged in the last years. The research papers, however, provide little space dedicated to describe the specific instructional programs in detail. This symposium is derived from a forthcoming volume in the book series Studies in Writing that aims to present design features of effective intervention programs for learning to write and writing to learn. Moreover, the volume discusses the theoretical background and empirically based evidences which support the specific intervention programs. The central aim of this symposium is to design and illustrate a reporting system for interventions in writing research, which can be useful to present and analyze specific features that should be considered to design effective instructional programs for learning-to-write and writing-to learn. The introducing paper of Rijlaarsdam and Janssen presents an initial standard system for reporting writing research interventions. In the other contributions effective writing interventions are reported in such a way that they could serve as examples of good reporting practices, and set the floor for future reports. Van Steendam and colleagues compare different forms of modelling and synthesizes these in design principles for modelling or observational learning in learning-to-write contexts. Mart?nez and colleagues focus on the improvement of content-learning via the training of strategies involved in writing synthesis texts from multiple complementary sources. H?gemann and colleagues discuss the effectiveness of three instructional programs designed to improve self-regulation skills in writing.

Design parameters for intervention studies in Writing Education

Meta-analysis,Instructional design,Teaching/instruction,Literacy,Writing/Literacy,Communities of practice

Gert Rijlaarsdam, University of Amsterdam, Netherlands; Tanja Janssen, Universiteit van Amsterdam, Netherlands;

While there is a certain standard when reporting about the dependent variables (variables, instruments, indices for validity and reliability), such a standard lacks for reporting the

independent variable, the intervention as a complex and hierarchical programming of learning activities. This hampers replication and concurrent studies, theory building and communication about effective writing instruction. It also hampers dissemination and implementation of effective interventions into practice, which is the ultimate goal of educational intervention research. When the basics of the intervention cannot be understood, invalid implementation will be the result. The central aim of this presentation is to design a specific reporting system for interventions in writing research. It will provide a standard system for reporting the independent variable in future instructional researches in a valid manner.

Stimulating freshmenís learning through modelling in academic writing courses

Instructional design,Teaching/instruction,Literacy,Writing/Literacy,Higher education

Mariet Raedts, KU Leuven, Netherlands; Luc De Grez, KU Leuven campus Brussels, Belgium; Gert Rijlaarsdam, University of Amsterdam, Netherlands; Huub Van den Bergh, Utrecht University, Netherlands; Luuk Van Waes, University of Antwerp, Belgium; Christiane Masui, Universiteit Hasselt, Belgium; Elke Van Steendam, KU Leuven, Belgium;

In observational learning learners acquire a new skill or strategy by watching or listening to a teacher or a peer who ëmodelsí or demonstrates the skill or the strategy under think-aloud conditions. Not all learners, however, will fully profit from watching a model. The effectiveness of observational learning depends on four constituent processes: attention, retention, reproduction and motivation (Bandura, 1986). Models usually present more information than an observer, especially a beginner, can process effectively. Hence, observers cannot learn unless they pay attention to the crucial elements in the displayed behavior. Next, they must be able to store these elements in their memory in the form of mental representations which they subsequently have to convert into actions when emulating the modeled behavior. In this presentation we discuss intervention studies in which we facilitated university studentsí writing and learning activities through observation tasks. First, we discuss a number of studies in which two different forms of observational learning were used: a more inductive type of modelling in which students had to infer information on the basis of think-aloud protocols of writing processes by peers (on video) on the one hand and a more directive type of modelling in which more expert peers model a specific strategy for writing/revising a text on the other hand. In a final study, we studied the directive (explicit) and less directive (implicit) type of modelling in more detail and disentangled the effects of attention, retention and motivation in the observational

Design principles for teaching effective reading and writing to learn contents

Meta-analysis,Teaching/instruction,Literacy,Writing/Literacy

Elena Martin, Universidad Autonoma de Madrid, Spain; Mar Mateos, Universidad Autonoma de Madrid, Spain; Isabel Martinez, Universidad Autonoma de Madrid, Spain; Gert Rijlaarsdam, University of Amsterdam, Netherlands;

The presentation will focus on the teaching of interactive use of reading and writing as a learning tool. Different meta?analyses about interventions focused on reading and writing instruction

have suggested the effectiveness of strategy?oriented programs for improving these competences in students. For that reason, the main goal will be to analyse the theoretical and empirical grounded principles of an effective strategy?oriented program. This intervention focuses specifically on the improvement of content-learning in upper primary education via the training of strategies involved in writing a synthesis text from multiple complementary sources on a particular topic. All these strategies are taught through different methodologies promoting the transfer control to the students (Fidalgo, Garcia, Torrance, & Robledo, 2009; Graham & Harris, 1993). This presentation will focus on explaining the learning activities, the sequence followed and the instructional actions carried out to improve content-learning. A detailed analysis of each phase of the intervention, a summary of previous intervention studies supporting the effectiveness of strategy intervention in improving topic-learning and the key components of the program will be provided.

Promoting self-regulatory skills in writing through story-tool and SRSD model with fourth graders

Instructional design,Teaching/instruction,Literacy,Writing/Literacy,Primary education

Julia Hogemann, Universidade do Minho, Portugal; Pedro Rosario, Universidade do Minho, Portugal; Jose Carlos Nunez, Universidad de Oviedo, Spain; Rebeca Cerezo, University of Oviedo, Spain; Celestino Rodriguez, University of Oviedo, Spain;

The present work focuses on the promotion of Self-Regulated skills in writing through 3 different instructional formulas. For many young struggling writers it is crucial to intervene as early as possible, providing them effective strategies for their learning. This study investigated the effectiveness of three instructional programs designed to improve self-regulation skills in writing compositions of 414 fourth gradersí (21 classes), namely: (i) the self-regulated strategy development (SRSD) model proposed by Graham and Harris (2003) which is based on teaching students, writing and self-regulation strategies; (ii) a combined program that includes the previous SRSD model plus the story-toll of ìSarilhos do Amarelo [yellow trials and tribulations]î developed by Rosario, Nunez & Gonzalez-Pienda (2007) with the aim of promoting studentsí use of self-regulated learning (SRL) strategies; (iii) and finally, an extension of the latter instructional program by adding suggestive feedback given by teachers after each writing task. Following a pre-post design with repeated measures along five months, instructional programs were compared to a control group that followed its own school curriculum. A summary of each instructional program and differential components of each one will be provided. In accordance with previous findings of Graham and Harris (2003), the SRSD model was seen to significantly improve the average writing quality of compositions, although its conjunction with the ìSarilhos do Amareloî story-toll lead to an overall superior performance and improvement in composition skills. In turn, adding suggestive feedback to instructional programs was not found to provide a conclusive effect on the quality of compositions.

C 3

25 August 2015 15:45 - 17:15

Room Green_A4

Invited SIG

Conceptual change

Is the conceptual change theoretical framework still a fruitful paradigm?

Keywords: Conceptual change,Mathematics,Science education,Teaching/instruction

Sig's: SIG 3 - Conceptual Change

Chairperson: Stella Vosniadou, National and Kapodistrian University of Athens, Greece

Organiser: Haim Eshach, Ben Gurion University of the Negev, Israel

Discussant: Tamer Amin, American University of Beirut, Lebanon

Vosniadou Stella Conceptual change research investigates the kind of learning that requires the substantial revision of existing knowledge, with a focus on explaining studentsí difficulties in understanding difficult and counter-intuitive concepts under conditions of systematic instruction. The conceptual change theoretical framework was originally developed to explain studentsí difficulties in learning science concepts, but quickly grew to make a larger claim about learning that transcends many domains of knowledge and can apply, amongst others, to mathematics, biology, psychology, history, and medicine (see Vosniadou, 2013). Nevertheless, many researchers are not persuaded that it is important to differentiate ëconceptual change learningí from other types of learning in general. Particularly in recent years, research on learning and instruction has focused on issues not related to conceptual change, such as motivation, emotion, classroom discourse, processing of multimedia information, collaborative learning, etc. The purpose of the present symposium is to ask whether the conceptual change theoretical framework is still a relevant and fruitful paradigm for research on learning and instruction and to bring together researchers from diverse subject-matter areas to address this question. References Vosniadou, S. (2013) Conceptual change in learning and instruction: The framework theory approach. In S. Vosniadou (Ed) The International Handbook of Conceptual Change, 2nd edition, New York, Routledge, pp. 11-30.

Conceptual change in science from a view of studentsí conceptions as dynamically emergent structures

Instructional design,Student learning,Teaching/instruction,Conceptual change

David Brown, University of Illinois at Urbana-Champaign, United States;

Studentsí conceptions and conceptual change has been a focus of research in science education for several decades. Such a focus remains fruitful, but a view of studentsí conceptions as dynamically emergent structures positions the field both to integrate existing, apparently opposed

views and to move forward in fruitful directions. If studentsí conceptions are viewed explicitly or implicitly as ìregular things,î as entities with static structure that react predictably to influences and that can be taken apart and put back together, opposing views can be difficult to coordinate. For example, a view of studentsí conceptions as coherent or fragmented would view conceptual elements as assembled or disassembled, a stark difference. By contrast, if studentsí conceptions are viewed as dynamically emergent structures that react often unpredictably to influences and that are more organic, unable to be easily assembled, disassembled, and reassembled, such ìopposingî views can be seen as different perspectives on these dynamically emergent structures. Viewing studentsí conceptions in this way has significant instructional implications, and this perspective positions the field to view conceptual dynamics as naturally embedded in and embedding other learning dynamics.

The conceptual change theoretical framework and research in teaching and teacher education

Instructional design,Student learning,Teaching/instruction,Conceptual change

Jan Vermunt, University of Cambridge, United Kingdom;

This contribution addresses the question whether the conceptual change approach has something to offer to research on teaching and teacher education, and the other way around. The conceptual change theoretical framework is founded on some essential ideas, e.g. that learning is not simply the addition of new information to existing knowledge, and that learning can be painful and difficult. Research on teacher knowledge and beliefs shows striking parallels with research on childrenís conceptual change. It has shown that teacher learning and professional development is not a simple process of knowledge accumulation, but may involve fundamental processes of belief change. Teachers may have different, conflicting beliefs about teaching, subject matter or pupils, even simultaneously. The process of teacher belief change has been shown to be difficult and often painstaking. The context of educational innovation or reform has proved to be an especially interesting context for the study of teacher belief change. Confrontation of fragmented sets of knowledge and beliefs with the aim of integrating them into a unified theory of practice seems an important way forward. In workplace learning experience is an important source of knowledge and development. From this perspective the conceptual change framework may benefit from theories and pedagogies developed in for example teacher education and medical education, where the integration of experiential and scientific knowledge is one of the main aims of professional learning and development.

Conceptual change through inquiry and argumentation: Successes and challenges

Instructional design,Student learning,Teaching/instruction,Conceptual change

Ronald J. Rinehart, Rutgers University, United States; Ravit Golan Duncan, Rutgers University, United States; Clark Chinn, Rutgers University, United States;

Many of the instructional methods designed to promote conceptual change in science have employed methods centered on inquiry and argumentation. In this paper, we discuss some

successes using this approach that have been found in the literature, as well as some significant challenges. Despite some claims that inquiry-oriented instruction is ineffective, a strong research base supports the efficacy of inquiry methods for promoting conceptual change. However, there are challenges in designing learning environments that can effectively foster conceptual change. We discuss four of these challenges, including the challenge of underdetermination. We argue that underdetermination is a difficult challenge that emerges in inquiry-oriented science classes. The finding underdetermination arises provides support for the conceptual change framework, which is grounded in the notion of incommensurability, from which underdetermination arises.

Yes: The conceptual change theoretical framework still remains a fruitful paradigm

Instructional design,Student learning,Teaching/instruction,Conceptual change

Stella Vosniadou, National and Kapodistrian University of Athens, Greece;

Yes: The conceptual change theoretical framework still remains a fruitful paradigm for research in learning science and mathematics Stella Vosniadou The Flinders University of South Australia, and Nattional and Kapodistrian University of Athens I will argue that the conceptual change theoretical framework is still a fruitful paradigm for research in learning and instruction, because it is the only framework that examines how we acquire new knowledge that comes in conflict with what we already know. Most new learning can be constructed on what is already known. Sometimes, however, prior knowledge comes in conflict with the new information to be acquired. When significant conceptual changes are required in order to learn something new, then learning is difficult, misconceptions and inert knowledge can be formed, and new strategies for deliberate and intentional knowledge acquisition must be in place. In this presentation I will describe how the framework theory explains what happens when conceptual change learning is required and draw its implications for instruction. Vosniadou, S. (2013) Conceptual change in learning and instruction: The framework theory approach. In S. Vosniadou (Ed) The International Handbook of Conceptual Change, 2nd edition, New York, Routledge, pp. 11-30.

C 4

25 August 2015 15:45 - 17:15

Room Brown_B4

Invited EARLI

Comprehension of text and graphics

Drawing: An aid to learning from animations?

Keywords: Comprehension of text and graphics,Computer-assisted learning,Instructional design,Multimedia learning

Sig's: SIG 2 - Comprehension of Text and Graphics

Chairperson: Mireille Betrancourt, University of Geneva, Switzerland

Organiser: Jean-Michel Boucheix, University of Dijon, LEAD-CNRS, France

Organiser: Richard Lowe, Curtin University, Australia

Discussant: Jean-Francois Rouet, Universite de Poitiers, France

It is possible that self-generation of drawings, which was shown efficient for text comprehension (Van Meter, Aleksic, Schwartz & Garner, 2006) could also be of general benefit to learning from animation. However, it remains an open question as to whether the promising findings of Mason, Lowe, & Tornatora (2013) in the case of tie Newton's cradle animation are generalizable to other types of content, animations, learners, and learning tasks. This symposium will be composed of four papers which examine this question.

Drawing: An aid to learning from animations?

Comprehension of text and graphics,Technology,Computer-assisted learning,Multimedia learning

Richard Lowe, Curtin University, Australia; Jean-Michel Boucheix, University of Dijon, LEAD-CNRS, France; Rolf Ploetzner, Institute of Media in Education, Germany;

This theoretical presentation is part of a symposium that explores the potential of self-generated drawing to support more effective animation-based learning. Animation is a two-edged sword - the benefits of being able to represent dynamics directly must be weighed against costs such as the inadvertent misdirection of learner attention. Requiring learners to generate drawings while studying texts has been shown to improve educational outcomes. It may be that a similar approach could be used with animations in order to ameliorate the negative effects they can have on learning. This presentation will use the Animation Processing Model as a framework to consider the possible contributions that both the process of drawing and drawing as a product could make to enhancing learning from animations. It will focus not only on mechanisms by which drawing could foster learning but also on barriers that may be encountered in trying to achieve the desired benefits.

The role of support in drawing for learning from complex animation

Educational technology,Instructional design,Comprehension of text and graphics,Computer-assisted learning,Multimedia learning

Rolf Ploetzner, Institute of Media in Education, Germany; Benjamin Fillisch, Freiburg University, Germany;

Recently, drawing has been investigated as a supportive technique for learning from animation. However, the animations employed in these studies were structurally rather simple. Is drawing also beneficial in learning from a structurally complex animation of a motor engine? In a current

study, we investigate drawing for learning from a complex animation. Two factors are varied: the availability of structural support (yes vs. no) and the learning technique to be applied (drawing vs. reflecting). In total, 80 undergraduate students are investigated, 20 in each group. Pretests include the assessment of the studentsí physical-technical knowledge, spatial ability, and domain-specific prior knowledge. All students receive an introduction to the learning technique they are supposed to apply, watch the animation several times, and make use of their learning techniques between two consecutive viewings. As a posttest, all students have to produce maximally five drawings of the motor engine, to assemble and demonstrate a physical model of the motor engine, and ñ making use of the assembled model ñ to explain the processes that take place in the motor engine. The students' demonstrations and explanations are videotaped for later analysis. The results of this study will not only provide new insights in how drawing for learning from complex animations can be supported, but will also contribute to the development of innovative techniques for assessing learning from dynamic presentations.

How self generated drawing may impact learning from animation

Experimental studies,Educational technology,Instructional design,Comprehension of text and graphics,Computer-assisted learning,Multimedia learning

Jean-Michel Boucheix, University of Dijon, LEAD-CNRS, France; Richard Lowe, Curtin University, Australia; Rolf Ploetzner, Institute of Media in Education, Germany; bianka breyer, University of Education, Freiburg, Germany;

Previous research showed self generated drawing from text improved comprehension (Van Meter, ?). Recent studies about the effect of self generated drawing from instructional animation on comprehension showed more mixed results (Mason, Lowe & Tornatora, 2013; Fillish & Ploetzner, 2014). The goal of the present study was to examine more precisely the effect of different self generated drawing conditions on the comprehension of a realistic animation showing how an earth worm moves. This animation was carefully chosen to prevent from any drawing difficulty. Regarding the configuration, the parts of the worm were composed of very simple shapes very easy to draw even when those shaped moved. However, the temporal aspect of the dynamics of the worm was complex. Participants were 80, 10-11 year old French primary school children. They were distributed across four experimental conditions: a control no-drawing condition; an imagining drawing condition, a drawing with invisible ink condition and a full drawing with visible ink condition. Executive functions of working memory were also tested. The experiment is currently in progress in schools. The complete results will be ready and presented at the conference.

A test of a process-oriented methodology for investigating drawing for learning from animation

Instructional design,Comprehension of text and graphics,Computer-assisted learning,Multimedia learning

Jonathan Groff, Universite de Bourgogne / Lead - CNRS, France; Jean-Michel Boucheix, University of Dijon, LEAD-CNRS, France; Richard Lowe, Curtin University, Australia; zheng

gin, curtin university, Australia; stephane argon, LEAD-CNRS, Universite de Bourgogne, France;

This study is focused on the use of a new method to investigate the cognitive processing involved in self-generated drawing when learning from an animation. We used an on-line method in this field which consisted in the synchronization of eye movement recording and drawing activity on a tactile screen tablet when learning from an animation. The goal of this paper is to present the research questions related to this method and to describe how the technique is currently settled up. Examples of results, from a first study in progress which aimed at testing the method and the device are exposed to illustrate the device in action

C 5

25 August 2015 15:45 - 17:15

Room Green_A3

Invited SIG

Researcher education

Trends influencing researcher education and careers

Keywords: Doctoral education,Higher education,Mixed-method research,Researcher education

Sig's: SIG 24 - Researcher Education and Careers

Chairperson: Montserrat Castello, Universitat Ramon Llull, Spain

Organiser: Kirsi Pyhalto, University of Oulu; University of Helsinki, Finland

Organiser: Lynn McAlpine, University of Oxford, United Kingdom

Discussant: Anne Nevgi, University of Helsinki, Finland

The invited symposium addresses the theoretical and methodological challenges underlying research and theory development in the area of researcher education and careers, in order to create a shared research agenda for the future. It bridges three communities of scholars who while sharing an interest in examining the experiences of early career researchers rarely converse: those investigating a) pedagogies of research education, b) genres of scholarly communication, and c) sociology of research work. The invited symposium consists of four co-authored papers that draw on and represent our collective and extensive knowledge of the three fields in order to synthesize what is known, to make visible what has been overlooked, and to attend to methodological considerations in order to draw out future lines of research. Each of the papers addresses a specific aspect of researcher education and careers in order to develop a future research agenda.

Global drivers of doctoral education

Case studies,Comparative studies,Educational policy,Researcher education,Doctoral education,Higher education

Jeffrey Keefer, New York University / VNSNY, United States; Soren Bengtsen, Aarhus University, Denmark; Lesley Andres, The University of British Columbia, Canada; Barbara Crossouard, University of Sussex, United Kingdom; Liliana del Pilar Gallego, University of Caldas, Spain; Kirsi Pyhalto, University of Oulu; University of Helsinki , Finland;

In the last decade doctoral education has undergone a sea change with several global trends increasingly apparent. Drivers of change include massification and professionalization of doctoral education and the introduction of quality assurance systems. The impact of these drivers, and the forms that they take, are dependent on doctoral education within a given national context. This research contributes to the literature on doctoral education by examining the ways in which these global trends and drivers are being taken up in policies and practices across six countries. We do so by comparing recent changes in Canada, Colombia, Denmark, Finland, the United Kingdom, and the United States. Each country case is based on national education policies, policy reports on doctoral education, and related materials. We highlight how drivers and trends have manifested themselves within individual countries and how similarities are evident across several landscapes. We then reflect on some of the tensions between drivers and the need to continue to compare and learn from the experiences of other systems and situations

Purposes and processes of changing researcher education: Implications for the curriculum

Meta-analysis,Researcher education,Doctoral education,Higher education

Margaret Kiley, Australian National University, Australia; Viivi Virtanen, University of Helsinki, Finland; Janice Malcolm, University of Kent, United Kingdom;

The purpose and future of PhDs is currently debated, in part due to the unpredictability of (academic) careers in the global labour market (Kehm, 2004; Walker et al 2008). The recent proliferation of new PhD formats is occurring in a context where we have only just begun to explore the nature of the formal and informal curriculum of doctoral education. This raises questions about how far doctoral education succeeds in providing appropriate professional preparation to the variety of the doctoral students. In this paper we identify possible approaches to the curriculum of doctoral education and discuss the implications of recent diversification for its future development. We draw on research on doctoral education as well as the emerging literature on early career researchers (ECRs) and on professional learning, particularly in relation to curriculum processes and outcomes. Finally, we suggest a research agenda for developing the doctoral curriculum.

Mentoring: a review of early career researcher studies

Meta-analysis, Researcher education,Doctoral education,Higher education

Yusuke Sakurai, University of Tokyo, Japan; Irina Lokhtina Antoniou, University of Leicester, Cyprus; Chaya Herman, University of Pretoria, South Africa; Ellen Boeren, University of Edinburgh, United Kingdom; Lynn McAlpine, University of Oxford, United Kingdom;

This paper provides a review of the literature which explores the mentoring of Early Career Researchers (ECRs) in the last decade. It was intended to provide useful insights for ECR mentoring practices and the development of relevant programs given the extent to which mentoring is often viewed as a tool to effectively develop ECRsí professional competence and confidence within their scholarly field. The review included journal articles published in five highly ranked higher education journals from 2005-2014, which emerged from a search using the keywords, ëmentor(ing)í combined with either ëearly career researcherí, ëpost-docí, ëdoctoral studentí in the title and/or the abstract. It also included similar articles from two journals which specifically focused on researchersí and academic development. A total of 23 articles were retrieved. For each article, we examined how mentoring was defined, how mentoring was examined conceptually and methodologically, what evidence was examined, and to what extent the literature pointed to future studies. The articles reviewed suggest the lack of a well-defined conceptualisation of mentoring for ECRs, which limited the potential to make policy recommendations for institutional mentoring practices. This paper concludes with a future research agenda, for instance, calling upon researchers to develop a clear conceptualisation for ECR mentoring, and to attend both mentorsí and menteesí experience in mentoring.

Researcher identities in transition

Case studies,Researcher education,Social aspects of learning,Social interaction,Doctoral education,Higher education

Montserrat Castello , Universitat Ramon Llull, Spain; Gina Wisker, University of Brighton, United Kingdom; Sofie Kobayashi, University of Copenhagen, Denmark; Jenna Vekkaila, University of Helsinki, Finland;

Researchers are now embarked upon what we define as a ërisk careerí, rather than, as previously, a relatively more predictable academic career. In this changing context, traditional milestones that enabled early career researchers to build their identities are disappearing. Instead, what we define as other emergent ësignalsí, the latent or clear indications from institutions and academic communities regarding career directions and necessary professional skills and attitudes should be identified and interpreted for researchers to adequately develop their new identities. The aim of this paper is twofold: a) to present a comprehensive framework of the notion of researcher identity by means of analysing those spheres of activity related to researcher and career development; and b) to relate researcher identities to the experiences of early career researchers with issues concerning signals, and strategies adopted to manage a risk career. Several case studies constructed from authorsí earlier work will be discussed in order to offer exemplar to identify issues and help manage the risk career, for researchers, supervisors and university managers.

25 August 2015 15:45 - 17:15

Room Purple_H3 (Rialto)

Invited EARLI

Teacher professional development

Perspectives on Poverty and Teacher Education

Keywords: At-risk students,Social aspects of learning,Teacher professional development,Teaching/instruction

Sig's: SIG 11 - Teaching and Teacher Education

Chairperson: Ian Thompson, University of Oxford, United Kingdom

Organiser: Ian Thompson, University of Oxford, United Kingdom

Discussant: Line Wittek, University of Oslo, Norway

Poverty continues to seriously constrain the life chances of many learners and there has been significant sociological and geographical work exploring the patterns of educational and other disadvantage associated with low incomes. Much education policy discourse adopted by governments across the UK over recent years has sought to address these matters, but educational inequalities persist. The ways in which the worlds of children and young people are conceptualised, defined and represented has emerged as a core concern for researchers, particularly those working from ëstudent voice' perspectives. But the effects of poverty on children and young people's beliefs, aspirations and achievements remain largely under-researched, as do school and community views on how poverty and social exclusion might be effectively tackled in education. Little is known about how student teachers, many of whom come from relatively privileged socio-economic backgrounds, conceptualise poverty and aim to address its effects on children's educational lives. Of particular concern to teacher educators working with ITE, is how best to prepare student teachers for the experiences they will have on placements and future employment both in schools in socially and economically deprived areas as well as in schools where poverty, though less prevalent, still has a significant detrimental effect on a minority of learners. The symposium offers research based perspectives on these matters by colleagues at four UK education departments as well as some of the teachers that they work with. The aim of the symposium is to consider the relationship between teacher education, child poverty, and educational achievement from a range of perspectives in order to contribute to the development of a research agenda involving collaboration between a number of universities.

Picturing poverty: Visual research methods to explore links between poverty, schooling and teaching

Case studies,Qualitative methods,In-service teacher education,At-risk students

M.L. White, University of East London, United Kingdom;

This paper draws on research into the process and outcomes of a participatory photography project, designed to explore how ITE students conceptualise and experience poverty and disadvantage when teaching in East London schools in socially and economically deprived areas. Here we report on the first of three interlinked projects in which post-graduate students are taught to use visual research methods in order to explore relationships between poverty, schooling and learning to teach. The use of photography allows for both literal and metaphorical representations (which can, of course, occur together in the same image). The setting for much of the research is school and teacher education in the London Borough of Newham which ranks 3rd highest on child poverty rates in the city, and 13th in the UK overall, at 30%.

Student teachers' perceptions of poverty in Glasgow: The Strathclyde Literacy Clinic

Qualitative methods,In-service teacher education,At-risk students

Sue Ellis, University of Strathclyde, United Kingdom;

This paper reports from a recent project in a major city in Scotland of student teachersí understandings of and attitudes towards poverty and their own role in relation to challenging inequality. The project is designed to build student teachersí fluency in real-time teaching responses in ways that provide a strong emotional and social dimension to their learning. It does this by using a short-term intervention in which student teachers use their literacy-teaching knowledge on real children with reading problems. The project is based in one of the poorest parts of Glasgow and research evidence suggests that it makes a real difference to the life chances of children in local primary schools. At the same time, it advances Strathclyde student teachersí skills and maintains the Universityís sector-leading status for literacy teacher education.

Preparing beginning teachers to understand and work effectively with young people living in poverty

Case studies,In-service teacher education,At-risk students

Ian Thompson, University of Oxford, United Kingdom;

The introduction of the Pupil Premium Grant for publicly funded schools in England to raise the attainment of disadvantaged pupils has provided both a new stimulus and new opportunities to ensure that trainee teachers understand the nature and impact of poverty on young people and are equipped to work effectively in overcoming the barriers to academic achievement that it may present. This paper, examining the nature and impact of a pupil premium research focus over two years within a well-established partnership PGCE programme, focuses both on the perspectives of the school-based teacher educators (how they conceive of the relationship between poverty and educational outcomes and how they encourage beginning teachers to engage with and respond to them) and on the experiences and developing understanding and attitudes of the student-teachers.

C 7

25 August 2015 15:45 - 17:15

Room Brown_B6

Symposium

Motivation

Promoting Effective Teachersí Motivating Styles: Recent Developments

Keywords: In-service teacher education,Motivation and emotion,Qualitative methods,Quantitative methods,Teacher professional development,Teaching/instruction

Sig's: SIG 8 - Motivation and Emotion

Chairperson: Jean-Louis Berger, Swiss Federal Institute for Vocational Eduation and Training (SFIVET), Switzerland

Organiser: Jean-Louis Berger, Swiss Federal Institute for Vocational Eduation and Training (SFIVET), Switzerland

Organiser: Virginie Hospel, Universite catholique de Louvain (UCL), Belgium

Discussant: Alexander Minnaert, University of Groningen, Netherlands

Consistent with the theme of the conference, this symposium brings a scientific perspective on teachers' motivating style, as conceptualized in the self-determination theory (SDT). According to SDT, different motivating styles (or teaching practices) have an important impact on students' motivation and engagement: Autonomy support (vs.control), structure (vs.chaos), and involvement. Given their vital importance for effective teaching, these teaching practices have recently attracted an increasing attention from researchers worldwide; however, some areas are still neglected. Notably, little is known about the relative importance of these practices, especially regarding students from different social background (paper1). Furthermore, a related critical question is how to promote the use of efficient practices, be it in the context of teacher professional development (paper2) or during a teacher education program (paper3). Finally, to promote a certain motivational style and assess its evolution, valid assessment tools are of crucial importance (paper4). This symposium aims to present recent research advances regarding these topics which, together, will contribute to the promotion of effective teaching in classrooms. The symposium includes studies conducted in four countries (Belgium, Germany, Korea and Switzerland) with teachers (paper2,3, and 4) and/or students (paper1,2 and 4). Multiple methods were used, such as teacher self-report, students' perceptions, and observation of motivating styles. The symposium discussant, Avi Assor, one of the leading experts on teachers' motivating styles, will provide a critical analysis of the presentations.

The relative importance of autonomy, structure and involvement for students' engagement

Quantitative methods,Teaching/instruction,Secondary education,Motivation and emotion

Virginie Hospel, Universite catholique de Louvain (UCL), Belgium; Benoit Galand, Universite catholique de Louvain (UCL), Belgium;

The Self-Determination Theory (SDT) posits that three dimensions of teachersí practices, namely autonomy support, structure and involvement have an impact on studentsí motivation and engagement. Theoretically, SDT seems to consider that these dimensions have the same importance. However, are these dimensions really equally important for studentsí engagement, whatever the context or the studentsí background (differential effects)? The current state of knowledge does not allow drawing clear conclusions about this question. Discussing the results of two studies led by questionnaires among 8th and 9th grade students, this presentation aimed at bringing some answers to this issue. The data were analyzed by means of multilevel analyses, taking different levels of analysis (e.g. classroom, student) into account. The results stressed the importance of teachersí structure for studentsí engagement. Autonomy support has a complementary role. Few effects of involvement and almost no differentials effects of teachersí practices were found. Implications will be discussed.

Autonomy in the context of dialogic classroom discourse

Mixed-method research,Video analysis,Teacher professional development,Teaching/instruction,Motivation and emotion

Katharina Kiemer, Technische Universitat Munchen (TUM), Germany; Alexander Groeschner, Technische Universitat Munchen (TUM), Germany; Mareike Kunter, Goethe-Universitat Frankfurt, Germany; Tina Seidel, Technische Universitat Munchen (TUM), Germany;

Both, research on dialogic classroom discourse, as well as autonomy support focus on the importance of verbal teacher-student interactions for studentsí learning outcomes, such as the co-construction of knowledge and learning motivation. The aim of the present study was to combine these strands of research in the context of a year-long, video-based teacher professional development programme (TPD) and explore the extent to which participating teachers (N=6) change their discourse practices towards a more non-controlling discourse behaviour. Furthermore, it was investigated to what extent such discourse practices foster and predict student autonomy. Latent growth curve models showed studentsí (N = 136) perceptions of classroom discourse, teacher autonomy-support and student autonomy to change analogous and significantly over the course of the intervention. Video analysis of classroom observations illustrated that teachers changed their discourse behaviour towards a more non-controlling one, which in turn predicted studentsí perceptions of autonomy directly after class.

The impact of the first year of teacher education on vocational teachersí motivating style

In-service teacher education, Teaching/instruction,Attitudes and beliefs,Self-efficacy,Vocational education,Motivation and emotion

Celine Girardet, Swiss Federal Institute for Vocational Education and Training (SFIVET), Switzerland; Jean-Louis Berger, Swiss Federal Institute for Vocational Eduation and Training (SFIVET), Switzerland; Cynthia Vaudroz, Swiss Federal Institute for Vocational Education and Training, Switzerland; Carmela Aprea, Friedrich-Schiller-University Jena, Germany;

Teacher education aims to guide teachers towards classroom management practices and beliefs which foster student motivation and engagement. The purpose of the present study was to examine the evolution of vocational teachersí classroom management-related beliefs and practices over the first year of teacher education. A vignette instrument inspired by the Problem in School Questionnaire (Deci, Schwartz, Sheinman, & Ryan, 1981), a scale adapted from various instruments (e.g., Shalter Bruening, 2010), as well as an adaptation of items from the Ohio State Teacher Efficacy Scale (Tschannen-Moran & Woolfolk Hoy, 2001) were administered twice (at the very beginning of teacher education and at the end of the first year) to 102 vocational education and training (VET) teachers. Results showed an evolution towards significantly less controlling practices. Additionally, teachers reduced their belief in the utility of promoting their studentsí extrinsic motivation. Finally, their self-efficacy for engaging students during class time increased with the teacher education program. Thus, teacher education seems to impact teachersí beliefs and practices about classroom management. Implications of this study for VET teacher education and for further research will be discussed.

The situation in school questionnaire: A new measure to tap into teachersí motivating style

Psychometrics,Teacher professional development,Teaching/instruction,Secondary education,Motivation and emotion

Maarten Vansteenkiste, Ghent University, Belgium; Johnmarshall Reeve, Korea University, Korea, Republic of; Jochen Delrue, University of Gent, Belgium; Nathalie Aelterman, Ghent University, Belgium; Bart Soenens, University of Gent, Belgium; Leen Haerens, University of Gent, Belgium;

Although the benefits of teachersí motivating style for studentsí learning and development has been document in previous studies relying on student or observer reports of motivating style, few studies have involved teachers. Relying on Self-Determination Theory, the present study aimed to develop and validate a new measure that tap into teachersí motivating style, thereby making use of vignettes rather than more generic items. Specifically, teachers indicated whether they engaged in autonomy-supportive, controlling, structuring and chaotic practices in response to 12 ecologically valid vignettes. After extensive pilot-testing, the Situation in School Questionnaire was validated in two large samples of Belgian high school teachers (N = 675; M age = 40.41 y) and Belgian high school students (N = 731; M age = 15.30 y). Multidimensional scaling and factor analyses provided insight in the structure of the scale, which was most parsimoniously described along two dimensions representing teacher autonomy support relative to control and teacher structure relative to chaos. Further, the two retained dimensions and four separate styles related in predictable ways with available external validation measures (e.g., TASQ; achievement goal climate) as well as hypothesized antecedents among teachers (e.g., burn-out; self-efficacy for teaching) and outcomes among students (e.g., teacher evaluations), testifying to the convergent, divergent and predictive validity of the newly developed questionnaire. It is

discussed how this new instrument may be used as a diagnostic tool to screen teachers, a reflection tool to promote self-awareness among teachers, and an evaluation tool to examine the effectiveness of a teacher training.

C 8

25 August 2015 15:45 - 17:15

Room Brown_B7

Symposium

Higher education

Adult learning: Demands of the labour market and its assessment

Keywords: Assessment methods and tools,Competencies,Higher education,Workplace learning

Sig's: SIG 4 - Higher Education

Chairperson: Edith Braun, University of Kassel, Germany

Organiser: Edith Braun, University of Kassel, Germany

Discussant: David Gijbels, University of Antwerp, Belgium

Facing a time with an impressive increase of high quality knowledge, and the ongoing need of lifelong learning, the question what qualifications and skills are expected on the labour market has to be raised, so that adults are able to meet today's demands. This symposium will look at two significant ways of training, in the context of higher education and the workplace, and how to assess the learning outcomes. The symposium will start with a comparison of the two ways of learning: Massing and Rammstedt will use PIAAC data in order to analyse competence differences of persons with vocational and academic qualifications. Kyndt et alii will draw the attention to workplace learning. They will look at the relationship between informal learning outcomes and different learning conditions at the workplace, using a scientific schema to classify informal learning conditions. Braun and Brachem will bring together higher education and the labour market. Following the Job Requirements Approach, they asked graduates what they actually do at work in order to outline relevant generic competences. In the last presentation, Coates and Mahat will highlight the importance of the international assessment of learning outcomes. Using AHELO data, they will underpin the need for using teaching and learning data as key information for stakeholders such as employers. David Gijbels will finally provide a comprehensive discussion of today's demands regarding adult learning and its assessment, which is still underrepresented in educational research.

Vocational vs. academic qualifications and basic literacy and numeracy skills

Assessment methods and tools,Competencies,Interdisciplinary,Higher education,Vocational education,Lifelong learning

Natascha Massing, GESIS-Leibniz Institute for the Social Sciences, Germany; Beatrice Rammstedt, GESIS, Germany;

One central aim of educational institutions is to equip students with basic competencies, such as literacy and numeracy skills. However, educational systems are not entirely hierarchical but also show horizontal differentiation, such as the distinction between general and vocational education. It can be assumed that the level of skill acquisition differs across these different education types. In this presentation, we show how adults with academic and vocational education differ in their literacy and numeracy competencies in Germany and across countries. We use data from the Programme for the International Assessment of Adult Competencies (PIAAC) to analyze this question. First results for Germany show that adults with academic qualifications in comparison to vocational qualifications generally achieve higher levels of literacy and numeracy skills (Maehler et al. 2013). However, as skill acquisition is not only limited to educational institutions but also takes place on the labor market, during life-long learning experiences and when carrying out tasks in everyday life, these factors also have to be considered when looking at differences between adults with vocational and academic qualifications. We analyze how these factors are related to different qualifications.

Labour marketsí requirement profiles for higher education graduates

Assessment methods and tools,Competencies,Higher education,Workplace learning

Edith Braun, University of Kassel, Germany; Julia-Carolin Brachem, DZHW, Germany;

With an increasing number of a cohort starting a higher education study programme (Orr et al. 2011) and a bachelor degree expected to be vocationally qualifying, higher education gets in charge of preparing students for the labour market (ìemployabilityî), providing them with factual knowledge as well as with generic competences (Teichler 2012). So far, the question what is expected of graduates on the labour market is discussed a lot, but a systematic and empirical basis is missing. In this contribution we will present a psychometrically tested questionnaire surveying activities graduates actually perform on the labour market. The questionnaire has been developed according to the method of the Job Requirements Approach, asking for the actual performance at the workplace instead of self-rated competences. 49 developed items belonging to 8 dimensions have been used in a sample of 11,504 graduates. A confirmatory factor analysis proved satisfactorily eight dimensions of generic, job-related activities and requirements of higher education graduates. Furthermore, first explorative analyses show different profiles of graduates of different study programmes. The results of this contribution might be particularly interesting for responsible persons in the area of academic teaching and study program development as well as for persons conducting graduates surveys.

Competence development in the workplace: Examining learning conditions for informal learning

Assessment methods and tools,Competencies,Vocational education,Workplace learning

Eva Kyndt, University of Leuven, Belgium;

Informal workplace learning has become a prominent reality in the knowledge society of today. For this reason, developing appropriate learning conditions in order to enhance workplace learning is dominating organisational agendas. However, research that investigates the relationship between important learning conditions and competences acquired through informal learning is scarce. Therefore, the main purpose of this study is to explore how the learning conditions in the workplace are related to the informal learning outcomes. A second goal is to gain insight into how the learning conditions are realised in the workplace. The current goals were achieved by means of a mixed method study with police inspectors. The national competency profile of police inspectors was a starting point of this study. In total 390 police inspectors completed a survey on informal learning conditions and the acquirement of their competences. After analysing these quantitative data, 9 police inspectors were interviewed. Within these interviews the results of the quantitative study as well as the practical realisation of the learning conditions were discussed. Overall, the results suggest that the learning conditions ëaccess to informationí, ëfeedbackí, ëopportunities for reflectioní and ëcoachingí are good predictors for the acquirement of ëgeneric learning outcomesí and ëorganisational level learning outcomesí. The learning condition ëcoachingí is also strongly associated with ëjob specific learning outcomesí. These results are in accordance with the perception of the interviewed police inspectors and possible explanations were offered.

Assessing higher education learning outcomes globally: Enhancing the transparency of higher ed.

Comparative studies,Assessment methods and tools,Educational policy,Competencies,Higher education

Hamish Coates, University of Melbourne, Australia; Marian Mahat, University of Melbourne, Australia;

This paper makes a contribution to scientific and scholarly research on assessing and authenticating student learning outcomes, and how this can be used to enhance the transparency of higher education. Taking the OECDís AHELO initiative as a case study, the paper discusses background theoretical and methodological history and literature as well as large scale data collection involving 23,000 students and 5,000 faculty at 250 institutions in 17 countries. Given the dearth of generalizable information on teaching and learning the expansion of this work carries immediate and potentially innovative opportunities for informing stakeholders such as graduates and industry about employability. This paper concludes by projecting opportunities and challenges for higher education institutions, systems and ranking providers.

C 9

25 August 2015 15:45 - 17:15

Room Brown_B5

Symposium

Workplace learning

Contrasting formal and informal learning: A SNA perspective on employeesí professional development

Keywords: Communities of learners,Informal learning,Lifelong learning,Mixed-method research,Social interaction,Workplace learning

Sig's: SIG 14 - Learning and Professional Development

Chairperson: Simon Beausaert, Universite catholique de Louvain (UCL), Belgium

Organiser: Simon Beausaert, Universite catholique de Louvain (UCL), Belgium

Discussant: Erno Lehtinen, University of Turku, Finland

Educational scientists have become increasingly interested in the role of relationships and collaboration in formal and informal learning settings. In this context, social network analysis (SNA) has become a widely accepted approach for analyzing such settings. The central stance of SNA is that individuals are embedded in a web of social interactions; exploring learning as a function of relationships. SNA also plays an important role in examining the role of social capital, which is concerned with the resources that exist within social relations, referred to as ties. The quality and structure of these ties determine the opportunities for interaction and access to resources. Additionally, based on the consistent finding that social network relations influence with whom and in which constellation we (collaboratively) learn, it has been emphasized that SNA cannot only contribute to our understanding of formal, but also informal (learning) networks. Here, SNA provides a particularly good frame to capture the social complexity of how (in)formal learning relationships are developed and maintained. During this symposium we will examine networked learning in both formal and informal contexts. The contributions demonstrate the value of a social network perspective in discussing various populations (e.g., primary, secondary and university teachers and employees), in various countries (e.g., Belgium, UK, Germany, Ö), or international settings, going from formal (Van Waes et al.) to informal settings (Rehm et al.; Palonen), and the combination (Rienties & Hoessein). Implications for designing professional development programs or enhancing informal learning in organizations/schools through networks will be discussed.

Networks and professional development: Study on teachers' networks in a training program

Mixed-method research,Teacher professional development,Social aspects of learning,Higher education,Workplace learning

Sara Van Waes, University of Antwerp, Belgium; Piet Van den Bossche, Universiteit Antwerpen, Belgium; Nienke Moolenaar, Universiteit Utrecht, Netherlands; Sven De Maeyer, Universiteit Antwerpen, Belgium; Peter Van Petegem, Universiteit Antwerpen, Belgium;

This study examined changes in university teachersí professional networks throughout an instructional formal development program. While research on the instructional development of university teachers has primarily focused on individual university teachersí learning and behavior, the role of collegial interactions for teachersí professional development has been largely overlooked. However, enhanced professional networks are increasingly regarded as an important outcome of development programs. We aimed to examine how teachersí networks changed throughout an instructional development program, and which mechanisms supported or constrained network change. Longitudinal social network data were collected from 16 university teachers participating in a 16-month instructional development program. By using network questionnaires we gained insight into the dynamics of teachersí networks over time. Longitudinal network analyses were triangulated with follow-up qualitative interview data to examine underlying mechanisms for network change over the course of the program. Results indicated that teachersí networks expanded during the instructional development program. Moreover, there was increasing variation among teachers in the number of relations and how their networks changed over time. Several underlying mechanisms for network change throughout the program were identified. Implications for policy and practice regarding the importance of social networks for university teachersí instructional development are discussed.

Why managers needs to look beyond the boundaries of professional development: a SNA-perspective

Qualitative methods,Teacher professional development,Social aspects of learning,Informal learning,Communities of learners

Bart Rienties, Open University UK, United Kingdom; Anesa Hosein, University of Surrey, United Kingdom;

The purpose of this contribution is to explore the type and frequency of strategic social connections that highly specialised early-career employees make outside of their professional development (PD) training programme to share practice. Using social network analysis and web-crawling, data is analysed for 114 participants to determine their strength of 402 external connections with persons with whom they share practice within and outside the organisation, the seniority of these persons, and similarity to their job area. The results highlight that early-career employee networks were hierarchically flat, that is, their sharing practice network of connectors composed of their (spousal) partner and (male) colleagues at the same hierarchical level. The persons whom the participants were least likely to discuss their practice were people in senior management roles. Activities within the organisation and the formation of learning communities from PD are lost as most of the sharing of practice/support comes from participantsí partners. Implications for PD will be discussed at EARLI 2015.

EduTags ñ How do teachers share resources using a collaborative tagging system?

Quantitative methods,Teacher professional development,Social aspects of learning,Informal learning,Communities of learners

Martin Rehm, University of Duisburg-Essen, Germany; Tobias Hoelterhof, University of Duisburg-Essen, Germany; Simon Beausaert, Universite catholique de Louvain (UCL), Belgium; Maike Gerken, Maastricht University, Netherlands; Mien Segers, Maastricht University, Netherlands;

Continuous professional development of teachers, fostered by collaborative knowledge sharing, is a pivotal element in providing high quality education. In this context Networks of Practice (NoP) have been proposed as a beneficial digital environment where such a process can be enhanced. Additionally, collaborative tagging systems (CTS) have gained popularity as one particular tool that allows individuals to collaboratively contribute to a growing repository of (online) resources that can improve teaching practice. CTS refers to user-centric systems that allow for social indexing of online resources. However, existing and popular CTS systems are seldom dedicated to teachers. Furthermore, only limited evidence is available on whether and to what extent teachers engage in knowledge sharing. Even more so, literature suggests that teachers are rather prone to prepare in isolation, in contrast to engaging into collaborative information sharing activities. Consequently, more insight is required in whether and how teachers effectively use social bookmarking platforms and what type of knowledge they share with each other. The present study addresses this issue by providing empirical evidence on a CTS called EduTags, which aims at establishing a NoP among (German speaking) primary and secondary school teachers. More specifically, based on longitudinal data from the users, we conduct a range of social network and cluster analyses to describe individualsí behavior on the platform, as well as to identify subgroups that have commonalities in their information sharing behavior that might otherwise be overlooked. Results and implications will be discussed at EARLI2015.

Openbadges ñ Discussing about virtual skill recognition

Educational technology,Social interaction,Citizenship education,E-learning/ Online learning,Informal learning,Out-of-school learning

Tuire Palonen, University of Turku, Finland;

Learning happens everywhere but it is still difficult to get recognition for skills and achievements outside of educational institutes. Could skill recognition be done through badges? Are badges a new wave of eLearning? In my presentation I will briefly tell what digital or open badges are and what is said about these in online tweet discussions. Which are the driving forces behind digital badges? The data for the study was collected by Twitter search engine in autumn 2014. It covers all tweets with #openbadges hastag, during one week. The data set includes altogether 1094 messages. In addition it was examined who and coming from where wrote these messages. The structure of the discussion was examined by the methods of Social Network Analysis (SNA) along NodeXl, Ucinet, and M3D software packages. The results indicate that the most active participants were not those that had most followers in Twitter but those close to open badge communities and actors of the field, coming mainly from USA, Canada, Australia, and UK. The

structure of the network was very centralized and the most tweets were sent by this core. Expectations for badges are high up and critical voices are almost lacking. The contribution of Twitter seems to be in creating metaknowledge, e.g. inmediating information about url addresses and seminars, to advertise books, and link other people to read articles around the topic. The educational references were targeted to higher education, science, technology, professional education and eLearning, i.e., where informal learning is emphasized.

C 10

25 August 2015 15:45 - 17:15

Room Cyan_F1

Symposium

Cognitive skills

Gaining by Explaining: Enhancing Learning by Receiving and Generating Explanations

Keywords: Cognitive skills,Experimental studies,Instructional design

Sig's: SIG 6 - Instructional Design

Chairperson: Vincent Hoogerheide, Erasmus University Rotterdam, Netherlands

Organiser: Vincent Hoogerheide, Erasmus University Rotterdam, Netherlands

Discussant: Alexander Renkl, University of Freiburg, Germany

Listening to and providing instructional explanations are core activities in educational practice. Research has shown that providing written or oral explanations to one-self or to others can help learners to integrate new knowledge with existing knowledge and repair errors in their cognitive schemas in a multitude of situations relevant to educational practice. But contrary to popular belief, students' explanations may lack coherence and quality, and therefore explaining does not always lead to better learning outcomes than not explaining. This symposium includes a coherent set of papers that complement each other; all examining under which conditions the effectiveness of receiving or generating explanations can be improved and/or higher quality of explanations achieved. Three papers focused on learning outcomes, showing that performance can be increased when explanations are aimed at a highly interested audience (vs. a low interested audience), given on video (vs. in writing), or accompanied by specific relevance instructions designed to elicit constructive activities (vs. active activities). The fourth paper zooms in on the quality of written explanations, showing that simply seeing a visualization containing the underlying conceptual structure during revision can enhance the cohesion of explanations. Together, these four papers provide interesting questions for future research, as well as applicable procedures for educational practice.

The benefits of giving explanations to others. Does the kind of audience matter?

Experimental studies,Instructional design,Cognitive skills,Multimedia learning

Hector Garcia-Rodicio, University of Cantabria, Spain; Gonzalo Silio, Verdemar Elementary School, Spain; Emilio Sanchez, Facultd de Psicologia, Spain;

Prior research has shown that teaching others is beneficial for learning. Here we tested if this effect is moderated by how interested the audience is in the subject. In one experiment 48 participants prepared and explained a subject (an educational application) to either a high-interest-audience or a low-interest-audience. A week later the participants took a test measuring their conceptual and procedural learning of the subject. The results showed that the participants who prepared and explained the subject for the high-interest-audience performed significantly better in the two tests. It is interpreted that having to teach an audience with high interest in the subject sets a higher standard of learning, making students do their best in preparing and explaining the subject.

Explaining learned material to others in writing vs. on video

Experimental studies,Instructional design,Cognitive skills,Multimedia learning

Vincent Hoogerheide, Erasmus University Rotterdam, Netherlands; Lian Deijckers, Erasmus University Rotterdam, Avans University of Applied Sciences, Netherlands; Sofie Loyens, University College Roosevelt, Netherlands; Anita Heijltjes, Avans Hogeschool, University of Applied Sciences, Netherlands; Tamara Van Gog, Utrecht University, Netherlands;

Prior research showed that studying with the intention to explain learned material to someone else and then explaining it to a (fictitious) other student on video led to better learning and transfer performance than not explaining, that is, studying with the intention to complete a test followed by restudying (Hoogerheide et al., 2014). In the present study, Experiment 1 (N = 123) investigated whether explaining in writing would yield the same benefits as explaining on video. Following a 2 X 2 design, participants either studied to explain learned material to someone else or to complete a test, and subsequently restudied or explained what they had learned in writing. Neither study intention nor explaining affected learning or transfer. Experiment 2 (N = 129) directly compared explaining in writing vs. on video. Participants were randomly assigned to the control (test study intention - restudy), explaining in writing (explanation study intention ñ explain in writing), or explaining on video (explanation study intention ñ explain on video) condition. Explaining on video, but not explaining in writing, enhanced learning more than not explaining. Surprisingly, given prior results (Hoogerheide et al. 2014), no effects were found on transfer performance. Explaining in writing was even less efficient for learning than restudying, as the same performance was attained with more effort investment during learning. These findings suggest that the benefits of explaining on video are not a result of engaging in explanation per se. It remains an open question what unique characteristic of explaining on video leads to better learning.

Visualizations support students in providing cohesive instructional explanations

Experimental studies,Instructional design,Cognitive skills,Multimedia learning

Andreas Lachner, University of Freiburg, Germany; Matthias Nuckles, University of Freiburg, Germany;

Providing written explanations is critical for studentsí academic and professional success. However, students are often challenged by the demand to provide effective explanations, as their explanations often lack cohesion. To support students writing cohesive explanations, we developed a visualization tool that visualizes the conceptual structure of studentsí explanations, and conducted a study to investigate its effectiveness. We found that students who received a visualization could both improve the cohesion to a larger extent than students who had no visualization during their revision. Thus, we concluded that the visualization tool is a valuable scaffold for supporting students in generating cohesive explanations.

Specific relevance instructions: Targeted learning activities and retrieval processes matter

Experimental studies,Instructional design,Cognitive skills,Multimedia learning

Julian Roelle, Bielefeld University, Germany; Kirsten Berthold, University of Bielefeld, Germany;

In an experiment with N = 192 university students, we analyzed the role targeted learning activity types and retrieval processes play with respect to the effects of specific relevance instructions on learning from instructional explanations in the domain of chemistry. We factorially varied whether specific relevance instructions were designed to elicit active or constructive learning activities (i.e., summarizing or generating inferences) and whether learners were reliant on retrieval processes when they responded to the specific relevance instructions. Regarding the targeted learning activity types, on an immediate posttest we found that learners who had received specific relevance instructions that were designed to elicit constructive activities only outperformed their counterparts on tasks that closely related to the elicited constructive activities. However, on a delayed posttest they also outperformed their counterparts on tasks that required summarizing and generating new inferences. Regarding retrieval processes, contrary to the notion that retrieval practice generally enhances learning we found that the type of learning activities that the specific relevance instructions were designed to elicit moderated the effect of being reliant on retrieval processes. Whereas the specific relevance instructions that were designed to elicit active activities were more beneficial when the learners responded to them in a retrieval mode, this did not apply to the specific relevance instructions that were designed to elicit constructive activities?

C 11

25 August 2015 15:45 - 17:15

Room Green_A1

Symposium

Mathematics education

Stimulating young childrenís mathematical competencies via numeracy games

Keywords: Cognitive development,Game-based learning,Mathematics,Teaching/instruction

Sig's: SIG 17 - Qualitative and Quantitative Approaches to Learning and Instruction

Chairperson: Andreas Obersteiner, Technische Universitat Munchen (TUM), Germany

Organiser: Joke Torbeyns, KU Leuven, Belgium

Organiser: Andreas Obersteiner, Technische Universitat Munchen (TUM), Germany

Discussant: Michael Schneider, University of Trier, Germany

Understanding number and basic mathematical skills (such as counting and fluency with elementary arithmetic operations) are very important in both children's and adults' lives. Consequently, teachers should stimulate the successful acquisition of number sense and basic mathematical skills from an early age on. Unfortunately, our knowledge of effective instructional activities enhancing the development of these basic mathematical competencies is limited. In particular, although game-based teaching seems to be an appropriate approach especially for young children, there is very limited empirical evidence on the effects that numeracy games actually have on children's learning. This symposium brings together four intervention studies on the effectiveness of numeracy games for enhancing young children's number sense and arithmetic development. The intervention studies involve different (early) numeracy games, ranging from conventional games to carefully designed serious educational games for new media including tablets. The different studies focus on enhancing pre- and elementary school children's early mathematical skills, from ages 4-5 up to ages 10-12, in three different countries. The combination of this variety in games, age range and context, with the methodological rigor of the presented studies, i.e., the systematic design as well as the focused analyses, both broadens and deepens our insights into effective educational activities for enhancing children's mathematical development. Michael Schneider, expert in the domain of cognitive psychology and mathematics education, will discuss the theoretical as well as educational significance and implications of these findings.

Fostering mathematical development of young children with conventional number-dice games

Quantitative methods,Teaching/instruction,Cognitive development,Numeracy,Mathematics,Early childhood education

Hedwig Gasteiger, Ludwig-Maximilians-Universitat (LMU), Germany;

Several studies have shown that childrenís performance on mathematical skills like number sequence, enumeration or subitizing before they enter school is strongly related to their later

mathematical performance in school. Therefore, early mathematics education should ensure that children acquire the essential prerequisites for further mathematical learning. By now, there is little evidence on which approaches for early mathematics learning are successful or more effective than others. We have some information about the effectiveness of play for mathematical learning under various conditions. The existing studies often use specifically designed games with lower achieving children or with children in school ñ mostly with explicit ambition to foster childrenís mathematical development. In an intervention study we examined whether playing conventional number-dice games (e.g., ludo) ñ if they are played ìnormallyî without a special training focus ñ can foster childrenís mathematical development at an early age more effectively than playing games with colour- or symbol-dice. Results of this study confirmed our assumption that children who played conventional number-dice games showed significantly higher learning gain from pre- to post-test than children in the control group.

Effectiveness of training of different magnitude processing skills for number and arithmetic

Quantitative methods,Teaching/instruction,Cognitive development,Numeracy,Mathematics,Early childhood education

Bieke Maertens, KU Leuven , Belgium; Bert De Smedt, University of Leuven, Belgium; Jan Elen, KU Leuven, Belgium; Bert Reynvoet, KU Leuven, Belgium;

Several studies have found a relation between, on the one hand, the performance in magnitude comparison and number line estimation tasks and, on the other hand, mathematical ability. Typically, it is assumed that performance on both tasks rely on the same underlying magnitude representation. However, some researchers have argued in favour of different mechanisms involved in both tasks due the absence of a relation between the performance in both tasks. To investigate the relations between magnitude comparison, number line estimation and mathematical ability more directly, we conducted an intervention study in which either comparison or number line estimation was trained in kindergartners, and examined (a) whether training on one skill could be generalized to the other skill (Experiment 1), and (b) whether training also led to improved arithmetic ability (Experiment 2). Results showed that training on comparison skills only improved comparison skills (and not number line estimation skills), whereas number line training led to improvement on both skills (Experiment 1). Results concerning transfer effects to arithmetic ability will be available at the conference (Experiment 2).

Effect of a symbolic versus nonsymbolic game-based numerical magnitude processing intervention

Quantitative methods,Teaching/instruction,Cognitive development,Numeracy,Mathematics,Primary education

Sarah Linsen, KU Leuven, Belgium; Lieven Verschaffel, KU Leuven, Belgium; Bert Reynvoet, KU Leuven, Belgium; Bert De Smedt, University of Leuven, Belgium;

There have been various attempts to perform intervention studies to enhance childrenís numerical magnitude processing. These studies showed that training numerical magnitude processing can be successful. However, it remains unclear whether intervention programs should focus on training symbolic or nonsymbolic numerical magnitude processing skills. To answer this question, we developed and evaluated two game-based numerical magnitude processing interventions: one that focused on symbolic processing and one that focused on nonsymbolic processing. Participants were 74 second-graders who were randomly assigned to either the symbolic intervention or the nonsymbolic intervention. Results showed that children improved on numerical magnitude processing and arithmetic skills, but no difference was found between symbolic versus nonsymbolic training.

Number Navigation Game: Developing adaptivity with arithmetic problem solving

Quantitative methods,Teaching/instruction,Cognitive development,Numeracy,Mathematics,Primary education

Boglarka Brezovszky, University of Turku, Finland; Jake McMullen, University of Turku, Finland; Nonmanut Pongsakdi, University of Turku, Finland; Minna Hannula-Sormunen, University of Turku, Finland; Erno Lehtinen, University of Turku, Finland; Gabriela Rodriguez Padilla, University of Turku, Finland;

The aim of this study is to examine the effects of Number Navigation in the enhancement of primary school studentsí adaptive and flexible arithmetic strategies by providing them with extensive practice in using different numerical relations in a gaming environment. The basis of the Number Navigation Game, developed in our project, is the external representation of base ten systems as a number square superimposed on varying maps. Within each map, players have to navigate their ship to pick up raw materials in order to build settlements. Navigation is by moves, and each move is an arithmetic equation which players need to strategically select. Participants of the study were 165 4-6 grade students who were randomly assigned in gaming (approximately 10 hours) and traditional mathematics teaching groups. Pre- and post-tests consisted of tests of arithmetic fluency and adaptivity with arithmetic problem solving. Repeated ANOVA showed a significant interaction effect in the development of adaptivity but not in arithmetic fluency. The gaming groups improved more in their adaptivity than the control group, effect sizes were between small and medium. Results suggest that Number Navigation is successful in training adaptivity with arithmetic problem solving.

C 12

25 August 2015 15:45 - 17:15

Room Purple_H2

Symposium

Teacher professional development

Teacher ethos ñ contrasting different concepts

Keywords: Morality,Special education,Teacher professional development,Values education

Sig's: SIG 13 - Moral and Democratic Education

Chairperson: Brigitte Latzko, University Leipzig, Germany

Organiser: Karin Heinrichs, Goethe-Universitat Frankfurt, Germany

Organiser: Fritz Oser, Universitat Freiburg, Switzerland

Discussant: Horst Biedermann, University of Salzburg, Austria

Teacher often have to deal with interpersonal conflicts and moral issues in their everyday life at school. Thus, there seems no doubt that teachers should be prepared to solve moral conflicts. However, in teacher education, ethos and professional morality seems to be hardly included. According to research it has to be admitted that ethos and associated concepts are currently discussed, but refer to different concepts and approaches: e.g. referring to moral judging, social interaction, empathy, moral courage or professional morality. Therefore, this symposium intends to bring together different approaches to teacher ethos in order to identify common assumptions and differences and to initiate interdisciplinary discussions in an emerging research field with great potential to gain significance. Paper 1 focuses on the need of teachers' value education. Paper 2, in contrast, refers to the teachers' lack of moral judgment competence and moral knowledge relevant to solve interpersonal conflicts at school. Paper 3 studies vocational trainers and proposed the need to feel responsible as well as to argue for moral decisions. Finally, paper 4 offers an instrument developed to grasp ethos of ICT teachers theoretically integrating four factors based on seven models of teacher ethos identified in the literature.

Developing teacher ethos in initial teacher education: Extrapolating from values pedagogy research

Teacher professional development,Emotion and cognition,Morality,Social aspects of learning,Values education

Terence Lovat, The University of Newcastle, Australia;

The spate of research around the world in values pedagogy, including germane fields of values education, character education, civics & citizenship education and moral education generally, can be seen to have impacted to some extent on school education (Arthur, 2010; Campbell et al., 2004; Benninga et al., 2011; Berkowitz, 2011; Davidson et al., 2011; Lovat, 2010, 2011; Lovat et al., 2010, 2011a, 2011b). There is, at the same time, less evidence of change in teacher education (Jorg et al., 2007; Lovat, 2008; Lovat et al., 2012). The paper will explore this theme, making reference to empirical evidence of the learning effects that have been demonstrated in school-based values pedagogical research and practice and furthermore the shape that teacher education would take if they were applied to that field.

A moral case-analysis approach to promote the professional ethos of teachers

Case studies,Teacher professional development,Cognitive development,Morality

Alfred Weinberger, Padagogische Hochschule der Diozese Linz, Austria;

Empirical evidence reveals that the teacher ethos or professional morality is viewed as an indispensable objective of teacher education but teacher educators barely implement the moral aspects of teaching into their coursework. The author proposes an approach to promote professional morality which is based on the analysis of cases. In this case-analysis approach the case is analysed on the moral dimension as well as on the epistemic dimension. The main purpose of the present quasi-experimental study was to examine the moral case-analysis approach in teacher education to promote the professional morality of pre-service teachers. It was hypothesized that participants (n = 94) who learn with the moral case analysis approach compared to a common knowledge-centered case-analysis 1) increase their moral judgment level to a greater extent and this gain will sustain and 2) use more discourse strategies to solve interpersonal conflicts. Further it was predicted that the analysis of hypothetical cases compared to real cases 3) is more effective with regard to the development of moral judgment competence and 4) less effective with regard to the use of discourse strategies. The results of the study emphasize the effectiveness of the moral case-analysis approach. Cases ñ real or hypothetical ñ have proved to be a powerful moral learning source. Implications for teacher education are discussed.

A decision ethos of vocational trainers

Teacher professional development,Morality,Social aspects of learning,Values education,Vocational education

Sarah Forster-Heinzer, University of Zurich, Switzerland;

Much literature of the professional teaching ethos as well as of vocational education exists, however, not in combination. This study aims at theoretically conceptualizing the pedagogical ethos of vocational trainers, at operationalizing the construct and at empirically measuring it. For this purpose an instrument was developed consisting of four scenarios describing professional training situations conflicted by diverse influences. The participants had to make a decision and reason for it. Totally, 606 vocational trainers of the cooking as well as automotive trade answered to the on-line questionnaire. A strong situational effect was found. Furthermore, it was found that vocational trainers with a higher pedagogical ethos value also show higher commitment to the pedagogical responsibility. This result confirms the theoretical assumption that ethos needs to be understood as a combination of decision and responsibility-related reasons. Moreover, some interesting occupation specific effects have been found, which will be presented in more detail.

On the hidden ethos of ICT teachers

Quantitative methods,Assessment methods and tools,Teacher professional development,Morality,Values education

Fritz Oser, Universitat Freiburg, Switzerland;

In this presentation first we present a short overview on central models of teachersí ethos and the respective empirical validations. From these models we have taken the most important dimensions like care, concern, responsibility, reflection, adaptivity for the creation of a questionnaire, which we introduced the study on computer literacy (ICILS). The subjects for this study were on one hand 3198 8-graders, and on the other hand 1373 teachers. In this paper we only report the teacher data and the respective scaling process. Starting with four factors on a theoretical level the factor analysis yielded only three dimensions. The questionnaire should ñ so our hope - become a valid and reliable instrument for capture the accountability and availability dimensions of ICT teachers, the so-called teacher ethos.

C 13

25 August 2015 15:45 - 17:15

Room Yellow_G5

Symposium

Social interaction in L&I

Getting into interthinking. Analysing interthinking dialogues across different educational settings

Keywords: Conversation/ Discourse analysis,Knowledge creation,Mixed-method research

Sig's: SIG 10 - Social Interaction in Learning and Instruction

Chairperson: Resi Damhuis, Marnix Academie, University for Teacher Training, Netherlands

Organiser: Resi Damhuis, Marnix Academie, University for Teacher Training, Netherlands

Discussant: Rupert Wegerif, University of Exeter, United Kingdom

Dialogue is considered an important learning tool: research has provided empirical support for Vygotsky's claim of the relationship between thought, language and social activity (Mercer, 2008). With respect to learning and education in the 21st century, the need for being able to work with knowledge together (ëinterthinking') is increasing (e.g. Bereiter, 2002; Wells & Claxton, 2002; Binkley et al., 2010). Heading towards a reflective society, dialogue is even considered an educational aim by itself (Wegerif, 2013). Education should offer many opportunities for interthinking: collaborative thinking through talk (Littleton & Mercer, 2013). However, such interthinking is rarely found in classrooms (op.cit.). Specific educational activities and

supporting teachers in implementing these activities can enhance the realisation of interthinking (e.g. Mercer & Sams, 2006; Rojas-Drummond & Mercer, 2003). This symposium brings together four educational approaches in order to investigate features of interthinking in actual practice: (1) problem solving between young children in inquiry projects (Hiddink), (2) historical reasoning and dialogue for higher grades in primary education (Damhuis, Tammes, Vonk & van der Zalm), (3) argumentation in values and knowledge education with young adults (Patry & Nussbaumer), (4) knowledge co-construction in higher education students' collaborative learning (Jurkowski & H?nze). Do these approaches challenge students to engage in interthinking? The discussant will address the communalities and differences between the approaches or settings in the four presentations. By combining our frameworks of analysis in this symposium, linking various SIGs, more insight is gained into interthinking, in order to recognize and possibly enhance it in education.

How young children construct argument sequences when solving problems in the storyline approach

Conversation/ Discourse analysis,Argumentation,Peer interaction,Problem solving,Primary education,Knowledge creation

Frans Hiddink, NHL University of Applied Sciences, Netherlands;

In their Thinking Together Approach Mercer and Littleton (2007) show that argumentation and thus interthinking could be enhanced in primary school children. However, their analysis of argumentation did not take into account the participantsí perspective. In order to analyze how children co-construct argumentation, their conversations should be analyzed sequentially (Coulter, 1990). Aim of this study is to gain insight in argumentation sequences, when young children are solving problems together. We investigated peer interactions of children during joint-problem-solving-activities in kindergarten before and after a set of 5 lessons that orient children on ëtalking rulesí, in line with The Thinking Together Approach (Dawes, Mercer, & Wegerif, 2000). The data are part of a larger project in kindergartens in the province Fryslan, the Netherlands. In the framework of the story line approach (Egan, 1986), small groups consisting of 2 to 4 children (4-7 years) were challenged to solve problems that come up in the story line. Conversational data during collaborative work were video-taped and (partially) transcribed. The argumentative exchanges during these peer interactions are analyzed, using several qualitative methods, informed by conversation analytic, ethnographic and socio-cultural discourse analysis (Cazden, 2001; Coulter, 1990; Mercer, 2005). First results show that argumentative sequences become more complex, after agreeing on talking rules: Children propose, argue, accept and reject more elaborately, and they use specific language related to interthinking more often in problem solving episodes. Examples will be discussed to show how young children co-construct argumentation. Implications for educators in kindergarten to enhance childrenís interthinking will be discussed.

Interthinking in history lessons in primary education

Video analysis,Reasoning,Social interaction,History,Primary education,Knowledge creation

Resi Damhuis, Marnix Academie, University for Teacher Training, Netherlands; Anne-Christien Tammes, Marnix Academie, Netherlands; Arie Vonk, Marnix Acadamy, Netherlands; Eefje van der Zalm, Marnix Academie, Netherlands;

Teachers signal severe difficulties in realizing interthinking dialogues (Littleton & Mercer, 2013). To offer teachers concrete support, we conducted educational design research (EDR), developing a didactics model for dialogues in history education in higher grades of primary school. Interthinking in this educational context has rarely been investigated. Historical reasoning may be a good way of learning how to interthink while learning how to do history. Although an analysis framework was developed for historical reasoning in secondary education (Van Drie & Van Boxtel, 2008), no information is available yet for primary education. In our last EDR phase we analysed how pupils actually think and reason historically in primary education, how their teachers enhance this, and how pupil and teacher participation are interrelated. Four teachers and their classes (pupils age 9-11) were videotaped during a history theme of 6 weeks. All whole-class dialogues were transcribed and analysed for the way dialogues evolve, specific language use for interthinking, and development of skills over time. Results. When teachers challenge pupilsí active thinking with a powerful problem (see also the other symposium presentations) and apply interaction strategies, pupils are able to reason historically together. Pupils use specific language that indicates interthinking (see other presentations), and also language that is specific for doing history. When pupils have more history knowledge, their historical reasoning may be deeper. Exemplary episodes will be presented to show what historical reasoning in primary education actually looks like. Implications for promoting interthinking in and through history lessons will be discussed.

Exchanging arguments in VaKE: Interthinking in values and knowledge education

Argumentation,Problem solving,Citizenship education,Values education,Secondary education,Knowledge creation

Jean-Luc Patry, Universitat Salzburg, Austria; Martina Nussbaumer, Paracelsus Medical University, Austria;

VaKE (Values and Knowledge Education) is a teaching tool permitting to combine values education and knowledge acquisition on a constructivist basis using discussions among students (interthinking) about values dilemmas and about information required for such a discussion. Two questions are addressed: How do interthinking and argumentation evolve across discussions, and do the students commit the naturalistic fallacy? The study was done with twelve students (17-18 years) coming from different countries in Europe and participating in a one-week summer academy using VaKE. The dilemma was whether Nabucco (gas pipeline Russia-Europe) should be built, the focus being how the students argue in favor or against it. Three discussions (before and after information collection; final discussion in a role-play) were recorded and analyzed using the framework of Miller (2006) that consists of a reconstruction of the logical structure of the arguments in form of argumentation trees; further, the arguments were coded as either descriptive or normative to identify the occurrence of naturalistic fallacies. Finally the coding system for language use indicating interthinking from Damhuis et al. (see their presentation) was used to permit comparison. The results show that the argumentation does not become more

discriminate (number of topics addressed) but more differentiated (more details within the respective topics), the naturalistic fallacies decrease, and the same language patterns as Damhuis et al. and other symposium presentations could be found. The discussion addresses the use of VaKE and the comparability of this study with the other presentations and the mutual benefits regarding interthinking.

How students learn from each other: Results of analyzing collaborative learning in higher education

Mixed-method research,Student learning,Peer interaction,Higher education,Cooperative/collaborative learning,Knowledge creation

Susanne Jurkowski, University of Kassel, Germany; Martin Haenze, University of Kassel, Germany;

In transactive statements students refer to and build up on their learning partnerís idea and, thereby, transform the partnerís idea into a more elaborate one (Berkowitz, Althof, Turner, & Bloch, 2008). This kind of talk may be an indicator for studentsí engagement in interthinking. Transactive statements can take different forms, including critiquing or extending the partnerís idea or integrating oneí own and the partnerís ideas (Azmitia & Montgomery, 1993; Kruger, 1992). Studies have shown that transactive statements are positively linked to a variety of learning results (Azmitia & Montgomery, 1993; Berkowitz & Gibbs, 1983; Kruger, 1992; MacDonald, Miell, & Morgan, 2000). However, to date studies are missing which analyze the shape transactive statements take in collaborative learning in higher education and their impact on studentsí learning results in this educational setting. A total of 82 university students worked in pairs. Their talk during collaborative learning was audiotaped and transcribed. Previous knowledge was pre-tested and learning results were post-tested. Analyses revealed that the studentsí transactive statements predominantly took the form of extending the partnerís idea through adding a further thought. Furthermore, the studentsí learning results were linked both to their own transactive statements and their partnerís transactive statements. However, students needed a while to perform transactive statements. In addition, sequences of transactive statements were prevalent in only a few groups. Also, specific language use related to transactive communication is analyzed (see other symposium presentations).

C 14

25 August 2015 15:45 - 17:15

Room Yellow_G2

Symposium

Emotion and affect

Epistemic Emotions: Examining antecedents and consequences when processing controversial information

Keywords: Attitudes and beliefs,Emotion and affect,Metacognition,Reasoning,Student learning

Sig's: SIG 8 - Motivation and Emotion

Chairperson: Kalypso Iordanou, University of Central Lancashire, Cyprus

Organiser: Krista Muis, McGill University, Canada

Organiser: Kalypso Iordanou, University of Central Lancashire, Cyprus

Discussant: Anat Zohar, Hebrew University, Israel

Epistemic emotions are emotions that are caused by cognitive qualities of task information and the processing of that information (Pekrun & Stephens, 2011), such as curiosity, enjoyment, confusion, anxiety, and frustration. As Pekrun and Linnenbrink-Garcia (2014) suggested, epistemic emotions profoundly impact students' performance. In the proposed symposium, four groups of international scholars will present their most recent work that delineates the causes of epistemic emotions and the role that they play when individuals deal with controversial information. First, Iordanou, Kendeou and Zembylas will present the results of a study that examined the effects of epistemic beliefs and emotions on reasoning when participants read two different perspectives about a controversial historical account, in which the participants exhibited strong beliefs in favor of one or the other side. In the second paper, Chevrier, Trevors, Muis, Psaradellis, and Di Leo will present a study that examined the role of epistemic emotions in mediating relations between epistemic beliefs, learning strategies, and achievement in the context of reading contradictory and conflicting information about climate change. Third, Str?ms? and Br?ten will discuss a study wherein they studied epistemic cognition in the form of justifications for knowledge claims and related behavioral decisions when students read about controversial risk-related health issues and explored to what extent epistemic emotions predicted student justifications. Finally, Stegmann, Meier, Pekrun, Siebeck, and Wiseman will present a study that examined to what extent interactions between task value, control, and socio-cognitive conflict during collaborative knowledge construction influence frustration.

The effect of epistemic beliefs and emotions in the reading of a controversial historical account

Attitudes and beliefs,Emotion and cognition,Metacognition,Reasoning

Kalypso Iordanou, University of Central Lancashire, Cyprus; Panayiota Kendeou, University of Minnesota, United States; Michalinos Zembylas , Open University of Cyprus, Cyprus;

The present study examined the effect of epistemic beliefs and emotions on reasoning when participants read two different accounts about a controversial historical account, in which the participants exhibited strong beliefs in favor of one or the other side. Young adults read two different accounts about a historical event, while thinking and reporting their emotions aloud. Think-aloud protocols were coded for cognitive processes and for emotions. Participantsí prior knowledge, epistemic beliefs and post reading reasoning were also measured using writing tasks.

Results showed that epistemic beliefs supported reasoning, particularly post reading reasoning. Both epistemic beliefs and emotions predicted online processing when participants read the text that contradicted their beliefs. The role of topic specific beliefs and emotions in understanding epistemic beliefs, reasoning and their relation will be discussed.

Tapping into relations between epistemic beliefs and emotions when reading contradictory information

Student learning,Achievement,Cognitive skills,Emotion and cognition,Self-regulation

Marianne Chevrier, McGill University, Canada; Krista Muis, McGill University, Canada; Gregory Trevors, McGill University, Canada; Cynthia Psaradellis, McGill University, Canada; Ivana Dileo, McGill University, Canada;

This study examined the role of epistemic emotions in mediating relations between epistemic beliefs, learning strategies, and achievement within a self-regulatory learning framework. Undergraduate students reported their epistemic beliefs, read contradictory texts on the topic of climate change while thinking aloud, and then reported their emotions experienced while reading. Think-aloud protocols were coded for self-regulatory processes. Path analyses revealed significant relations between dimensions of epistemic beliefs, epistemic emotions, learning strategies and achievement. This study bears on both Pekrunís (2006) control-value theory of emotions and Muisís (2007) model of self-regulated learning by shedding light on the role of epistemic beliefs as antecedents to epistemic emotions and of epistemic emotions as mediators between epistemic beliefs and learning strategies and outcomes.

Hot and cold justifications when students read about controversial health issues

Student learning,Argumentation,Attitudes and beliefs,Reasoning,Higher education

Helge Stromso, University of Oslo, Norway; Ivar Braten, University of Oslo, Norway;

This study examined studentsí justifications for knowledge claims encountered in texts about controversial health issues and their behavioral decisions regarding those issues. Additionally, we explored to what extent justifications could be characterized as emotional versus purely rational. Results indicated that justifications may differ when students justify their trust in textual knowledge claims and when they justify behavioral decisions related to those claims. Moreover, justifications may vary across issues and involve epistemic emotions in addition to rational reasoning. These findings may have implications for instructional interventions to promote more adaptive epistemic thinking among students, suggesting that instructional efforts should take such differences in the object and context of justifications into consideration, and also be aware that hot justifications may not easily be changed by rational means alone.

Why learners become frustrated thru collaboration: Effects of conflicts, task control and task value

Experimental studies,Emotion and cognition,Higher education,Computer-supported collaborative learning

Karsten Stegmann , University of Munich, Germany; Elisabeth Meier, Ludwig-Maximilians-Universitat (LMU), Germany; Reinhard Pekrun, Ludwig-Maximilians-Universitat (LMU), Germany; matthias siebeck, Ludwig Maximilians University, Germany; Jeffrey Wiseman, McGill University, Canada;

Socio-cognitive conflicts are regarded as a central mechanism of collaborative knowledge construction. Research on collaborative knowledge construction is usually focusing on cognitive aspects of conflicts (e.g., conflict resolution). It is the nature of a conflict, however, to be accompanied by (mostly) negative emotions like frustration. Recent studies provide evidence that epistemic emotions like frustration resulting from socio-cognitive conflicts play a certain role in knowledge construction. Therefore, the causes of frustration need to be understood in any case to be able to adapt interventions with regard to frustration in educational settings. Besides the assumption that frustration can be triggered by socio-cognitive conflict, the control-value theory proposes that the extent of frustration experienced during learning activities depends on the task value attributed to the activity by the learner and the expected control over the task. The research question at hand is, to what extent appraisal of task value, appraisal of task control, a socio-cognitive conflict during collaborative knowledge construction, and the interaction thereof have effects on frustration. In a technology-enhanced collaborative learning environment for medical education, undergraduate students (N = 151) collaborated with a learning partner in order to diagnose patients. Results show that socio-cognitive conflicts affect frustration, but only in interaction with task value: high appraisal regarding task value seems to cause frustration, if learners experience socio-cognitive conflicts. Task control had, apparently in conflict with the control-value theory, a positive effect on frustration. A mismatch between appraisal and the real task might be an explanation for this positive effect.

C 15

25 August 2015 15:45 - 17:15

Room Brown_B8

Symposium

At-risk students

Impact of externalizing problems on studentís achievement motivation and academic skills development

Keywords: Achievement,At-risk students,Developmental processes,Learning and developmental difficulties,Motivation and emotion

Sig's: SIG 8 - Motivation and Emotion

Chairperson: Eija Pakarinen, University of Jyvaskyla, Finland

Organiser: Riitta-Leena Metsapelto, University of Jyvaskyla, Finland

Organiser: Eija Pakarinen, University of Jyvaskyla, Finland

Discussant: Anna-Maija Poikkeus, University of Jyvaskyla, Finland

Strong evidence indicates that externalizing problems interfere with learning and the acquisition of academic skills. More research, however, is needed on 1) the mechanisms that account for the association between externalizing problems and poor academic outcomes, and 2) the interplay between externalizing problems and other domains of functioning (e.g., internalizing problems, self-esteem, and reading difficulties). This symposium, consisting of four studies conducted in Finland, Germany, and United States contribute to previous research by providing insight on the school paths of children with externalizing problems. The first paper (Mets?pelto et al.) investigates the co-development of externalizing problems and task-motivation in literacy in early school years, and examines their influence on the development of literacy skills and school engagement. The second paper (Dever et al.) examines how externalizing problems alone and in combination with internalizing problems relate to adolescent's motivational profiles in goal orientation, academic efficacy, and subjective task value. The third paper (Zimmermann & K?ller) examines middle-school-age students to gain understanding on the linkages between externalizing problems and academic achievement and the role of self-esteem in explaining this association. The fourth paper (Torppa et al.), based on a follow-up from 4 to 15 years, examines the association of externalizing problems and inattention with reading difficulties (RD). These four papers provide new knowledge of the developmental paths and consequences of externalizing problems in the school context, which enables better responding to the needs for learning and engagement among children with problem behaviors. The implications for theory and practice will be discussed.

Development of externalizing problems and task-motivation in early school years

Quantitative methods,Student learning,At-risk students,Interdisciplinary,Primary education,Motivation and emotion

Riitta-Leena Metsapelto, University of Jyvaskyla, Finland; Gintautas Silinskas, University of Jyvaskyla, Finland; Noona Kiuru, University of Jyvaskyla, Finland; Anna-Maija Poikkeus, University of Jyvaskyla, Finland; Eija Pakarinen, University of Jyvaskyla, Finland; Kati Vasalampi, University of Jyvaskyla, Finland; Marja-Kristiina Lerkkanen, University of Jyvaskyla, Finland; Jari-Erik Nurmi, University of Jyvaskyla, Finland;

This study focused on the co-development of externalizing problems and task motivation in early school years (N=642; 43% girls). Latent growth modeling was used to examine the initial levels and the rates of change in externalizing problems and literacy-related task-motivation from Grade 1 to Grade 4, and how they were related to 1) each other across domains, 2) preceding literacy skills at school entry, gender, and parental education, and 3) the developmental outcomes (school engagement and literacy skills in Grade 6). The findings showed that, on average, both

externalizing problems and task-motivation decreased over time although there was significant variance among children around this developmental trend. Significant cross-domain associations indicated that high initial externalizing problems were related to low initial task-motivation. Moreover, the higher the childrenís initial task-motivation, the higher was the rate of change in the externalizing problems. Analysis of predictors and outcomes showed that children from lower educated families, boys (vs. girls) and children with low literacy skills at school entry had higher externalizing problems, and girls had higher task-motivation than boys. High initial task-motivation and low rate of change in externalizing problems predicted high school engagement in Grade 6. Furthermore, the slope of task-motivation positively predicted literacy skills in Grade 6. Findings emphasize the need to examine externalizing problems and task-motivation conjointly to understand their co-development in early school years. Findings also contribute to our knowledge on the mechanisms through which externalizing problems might affect academic outcomes and school engagement as children move through the school system.

Motivational profiles by level of internalizing and externalizing risk

Quantitative methods,Student learning,At-risk students,Interdisciplinary,Secondary education,Motivation and emotion

Bridget Dever, Lehigh University, United States; Kristen Fletcher, Lehigh University, United States; Alana Telesford, Lehigh University, United States;

Research indicates that behavioral and emotional difficulties among students are related to lower levels academic achievement (Algozzine, Putnam, & Horner, 2010). However, few researchers have considered motivation within special populations of students, such as those with behavioral and emotional difficulties. The present study sought to determine whether students' motivational profiles differ according to risk for developing internalizing or externalizing problems. It was hypothesized that motivation would differ by level of risk for internalizing and externalizing problems in meaningful ways, which would suggest: 1) that motivational differences by behavioral and emotional difficulties could be identified early; and 2) that motivational processes could help to explain differences in academic achievement that emerge later for those with specific behavioral and emotional difficulties. Participants were 4,083 students from 7 high schools in the southeastern United States. Analyses suggested that mastery goals were lowest among those with combined risk for internalizing and externalizing disorders, whereas internalizing risk predicted the highest performance avoidance goals. No differences in performance approach goals were found. Those with internalizing and combined risk reported the lowest levels of efficacy and the highest levels of cost. Those with externalizing and combined risk reported the lowest levels of attainment value. Combined risk predicted the lowest levels of utility values. These findings provide preliminary evidence that motivation may serve as a mechanism through which even early risk for a later disorder translates into lower levels of academic achievement.

Longitudinal links between adolescentsí externalizing problems, self-esteem and academic achievement

Quantitative methods,Student learning,At-risk students,Interdisciplinary,Secondary education

Friederike Zimmermann, University of Kiel, Germany; Olaf Koeller, Leibniz Institute for Science and Mathematics Education, Germany;

Studentsí externalizing problems and their academic achievement are negatively related. Previous research on the longitudinal linkage of these two variables and on potential mediators of their relationship is, however, scarce. The main purposes of the current study were a) to investigate the longitudinal intertwining of adolescentsí externalizing behavior and academic achievement and b) to explore the mediating role of self-esteem between achievement and externalizing problems. Participants were N = 1045 junior high school students (50% female) followed from Grade 5 to Grade 7 to Grade 9. Academic achievement was measured by standardized tests and teacher-given grades in two major school subjects. The results of full-forward structural equation modeling were fairly consistent over time and across subjects. Externalizing problems were reflected in school grades (more than in performance tests), and reversely, school grades affected future externalizing problems. Self-esteem served as a partial mediator between school grades and subsequent externalizing problems. Implications for educational practice and future research are discussed.

Externalizing problems and dyslexia: A follow-up study from age 4 to age 15

Quantitative methods,Student learning,At-risk students,Interdisciplinary,Primary education,Motivation and emotion

Minna Torppa, University of Jyvaskyla, Finland; Pauliina Parhiala, University of Jyvaskyla, Finland; Kenneth Eklund, University of Jyvaskyla, Finland; Timo Ahonen, University of Jyvaskyla, Finland;

This longitudinal study examined the link between reading difficulties, externalizing problems, and inattention. The data (n = 170) spans from 4 years to 15 years and includes parental evaluations of externalizing behavior at ages 4, 6, 9, and 15, and adolescent own evaluation at age 15. Diagnosis of reading difficulties was based on individual assessment of several reading accuracy and fluency tasks in grade 2 (age 8). The measures of behavior were based on BASC scales of aggression, hyperactivity, and attention at ages 4, 6, and 9, and on SDQ scales of hyperactivity/inattention and conduct problems at age 15. Analyses of variance included also examination of gender. Findings indicated that aggression, hyperactivity, and conduct problems were not linked to reading difficulties. Attention problems, however, differentiated the participants with and without reading difficulties. The differences were evident already at age four years suggesting that the problems are not secondary behavioral problems caused by reaction to reading difficulties the children faced in school.

C 16

25 August 2015 15:45 - 17:15

Room Blue2_D2

Symposium

Self-regulation

Assessing and promoting the development of self-regulation in early childhood

Keywords: Developmental processes,Early childhood education,Mixed-method research,Parental involvement in learning,Self-regulation,Video analysis

Sig's: SIG 16 - Metacognition

Chairperson: Silke Hertel, Ruprecht-Karls-Universitat Heidelberg, Germany

Organiser: Silke Hertel, Ruprecht-Karls-Universitat Heidelberg, Germany

Organiser: Kim Gartner, Ruprecht-Karls-Universitat Heidelberg, Germany

Discussant: Deborah Pino-Pasternak, Murdoch University, Australia

The symposium addresses important questions regarding the development of self-regulation in early childhood. To date, research on self-regulation has focussed mainly on preschool and school-aged children. Less is known about the development of self-regulation in infancy and toddlerhood (Garon, Bryson, & Smith, 2008; McGuigan & N??ez, 2006). In this very early age, children are highly dependent upon their parent's external support, i.e. co-regulation, to regulate their internal states and behaviours. Among other relevant parenting behaviours, parental scaffolding is assumed to be crucial for the development of self-regulation (Pino-Pasternak & Whitebread, 2010). However, there is a lack of research addressing the assessment of self-regulation as well as parental co-regulation and scaffolding in early childhood. In our symposium we focus on three major questions related to the development of self-regulation and to the use of parental co-regulation strategies in infancy and toddlerhood: (1) How do young children manage to exert self-regulation (i.e. which strategies do they show)? (2) How can self-regulation be assessed in infancy and toddlerhood? (3) How do parents support the development of self-regulation at this age? Our symposium gives new insights into the development and assessment of self-regulation in infancy and toddlerhood. Implications for the development of parent trainings to support self-regulation competencies at an early stage will be discussed.

Dynamics of self-control during delay of gratification in two- and three-year olds

Video analysis,Assessment methods and tools,Developmental processes,Self-regulation,Early childhood education

Hanna Mulder, Utrecht University, Netherlands; Heleen van Ravenswaaij, Utrecht University, Netherlands; Josje Verhagen, Utrecht University, Netherlands; Paul Leseman, Utrecht University, Netherlands;

Self-control develops rapidly during the toddler and preschool years. However, we do not know yet exactly how young children manage to exert self-control. Such knowledge is important, because it might open up pathways for promoting self-regulation in children from a young age

onwards. The current study aimed to investigate the motor, verbal, and looking strategies two- and three-year-olds use when their self-control is taxed during a delay of gratification situation, and to study how the use of these strategies relates to age and childrenís inhibitory control in other contexts. First, in an in-depth observation study, we have shown that toddlers and pre-schoolers already use a clever mix of strategies of controlling attention and motor responses to be able to effectively exert self-control. Clear individual differences in strategy use were observed in relation to age and childrenís report-based inhibitory control. Second, using data from a large longitudinal cohort study, we have shown that two- and three-year-olds speak relatively infrequently when waiting during a delay of gratification task. Verbal strategies (talking about something else or repeating the task rule) were not related to report-based inhibitory control. These studies suggest that delaying gratification constitutes a clever and dynamic mix of strategies of controlling attention and motor responses in two- and three-year-old children. At this age, children do not seem to rely on using verbal strategies yet. Further research is needed to study how caregivers can support childrenís attention and motor strategies for exerting self-control in toddlerhood.

Measuring parental scaffolding and its relationship with cognitive self-regulation in infants

Video analysis,Assessment methods and tools,Parental involvement in learning,Self-regulation,Early childhood education

Dave Neale, University of Cambridge, United Kingdom; Marisol Basilio, University of Cambridge, United Kingdom; David Whitebread, University of Cambridge, United Kingdom;

There is a strong body of evidence supporting the relationship between parental relational styles and early emotional self-regulation (SR). However, in contrast, we know surprisingly little about parental behaviours that support childrenís cognitive SR skills as they engage in goal-oriented behaviours and problem solving. Research with children from 5 years and older, shows that parents that are effective in supporting their SR skills, display strategies in three main areas: a) supporting the childís autonomy by encouraging them to take active part in the aspects of the tasks they can perform independently; b) providing an adequate level of challenge according to the childís current level of performance; c) responding accurately and timely to the childís instructional and emotional needs. In this paper we aim to contribute to the methodological tools available for the study of parental strategies that are likely to support childrenís cognitive SR in early childhood. Based on two longitudinal studies, we present an array of measures of different dimensions of parental mediational strategies, and their relationship with childrenís indicators of SR across time. The first study involved 30 children at age 12, 18 and 24 months; the second study involved assessments of 16 children at 14, 16 and 18 months. Parentsí scaffolding strategies were assessed at two levels: a qualitative scale characterising parentsí levels of responsiveness, autonomy and challenge during the whole duration of the interaction; and a microgenetic analysis, identifying specific behaviours in real time. Full results of these two longitudinal studies will be presented.

Are parents with favourable co-regulation-strategies better at scaffolding their child?

Quantitative methods,Video analysis,Parental involvement in learning,Self-regulation,Early childhood education

Kim Gartner, Ruprecht-Karls-Universitat Heidelberg, Germany; Silke Hertel, Ruprecht-Karls-Universitat Heidelberg, Germany; Andreas Eickhorst, German Youth Institute, Munich, Germany; Manfred Cierpka, Institute for Psychosomatic Cooperation Research and Family Therapy, Heidelberg, Germany; Sabina Pauen, Ruprecht-Karls-Universitat Heidelberg, Germany;

Until children have fully developed their self-regulation skills, they largely depend on their parentsí co-regulation to control and modulate their internal states and behaviour. Parentsí co-regulation can focus on emotional and motivational as well as cognitive processes. Cognitive co-regulation is often referred to as scaffolding and becomes especially relevant in problem-solving situations. One can assume that parentsí everyday co-regulation behaviour may influence their scaffolding behaviour in problem-solving situations. In this paper we aim at analysing the interplay of parental co-regulation and scaffolding behaviour. Specifically, we investigate if parental co-regulation strategies can predict parental scaffolding competencies in problem-solving situations. Based on an experimental intervention study, we present data from 47 parent-child dyads (children aged 18 to 36 months) at pre-test. Parentsí co-regulation and scaffolding behaviours were measured via self-ratings and questionnaires (IMMA 1-6) and situational judgement tests. Video-observations of parent-child-interactions in problem-solving situations are in the final stage of being coded and will be included in further analyses. Hierarchical multiple regression analyses show that parental scaffolding-competencies can especially be predicted by favourable co-regulation strategies. Unfavourable co-regulation strategies and background variables cannot explain a significant amount of variance. The influence of parentsí everyday co-regulation behaviour on their scaffolding competencies should be taken into consideration especially in the design of interventions aimed at promoting parental behaviours to support the development of self-regulation in early childhood.

The interplay of executive functions, parent-child interaction and vocabulary learning with an app

Content analysis,Quantitative methods,Parental involvement in learning,Self-regulation,Early childhood education,Computer-assisted learning

Inge Molenaar, Radboud University Nijmegen, Netherlands; Rosa Teepe, Radboud Universiteit Nijmegen, Netherlands; Ludo Verhoeven, Radboud Universiteit Nijmegen, Netherlands;

This study explores the interrelations between childrenísí executive functions, characteristics of parent-child interaction and vocabulary learning from an app-game. Parents and children (n=23) played a newly developed game-app designed to elicit rich parent-child interaction to enhance the childís vocabulary learning. The childís executive functions were expected to positively influence the childís interaction with the parent as well as their learning from the app. The results indicate a negative correlation between childrenís cognitive flexibility and expressive vocabulary knowledge gain. Moreover, this study shows that inhibitory control might be related to content related utterances of the child and cognitive flexibility seems to create room for non-contingent

parental responses. Content related utterances in parent-child interaction were related to childrenís learning, yet no effect was found of parent contingency. Further analysis of these preliminary findings will elaborate on how executive functions may have implications for childrenís interaction with their parents and their consecutive learning.

C 17

25 August 2015 15:45 - 17:15

Room Green_A2

Symposium

Research methodology

Language as an Issue for Researchers

Keywords: Communities of practice,Language (L1/Standard Language),Mixed-method research

Sig's: SIG 17 - Qualitative and Quantitative Approaches to Learning and Instruction

Chairperson: Josephine Moate, University of Jyvaskyla, Finland

Organiser: David Clarke, University of Melbourne, Australia

Discussant: Sara Hennessy, University of Cambridge, United Kingdom

Language has frequently been the object of research (e.g. Alexander, 2001; Cazden, 2001; Xu & Clarke, 2013). It is also recognised that much of the research we undertake is dependent on the management of language as data from which we develop insights into other things (e.g. Mercer, 2010; Nisbett & Wilson, 1977). The extent to which language inevitably shapes our research and the communication of our findings has also attracted attention (Bieista, 2005), including the question of authoring language and culture (Clarke, 2013). The presentations in this symposium address different issues related to the role language plays in the research process. Clarke explores the function of theory, mediated by language, in determining both data and findings, by juxtaposing parallel analyses of the same lesson sequence. Moate et al. investigate the assumptions behind the use of language and the assumed linguistic repertoires of participants in educational research by applying four different methodological approaches to the same transcribed data set. Kusznirczuk examines the possible development of a form of critical literacy among educational researchers through a shared discourse of research practice. Mesiti and Clarke report an investigation into the pedagogical terms by which educators in different cultures describe classroom practice and the implications of any differences for both research and theory construction. The goal of these combined presentations is to examine how the language of researchers structures engagement in the research process, with research settings and participants, and, consequently shapes findings, instructional advocacy, and further theorising.

Research Language: The danger of a single story

Mixed-method research,Organization of educational research(sounds strange),Social interaction,Science education,Secondary education,Communities of practice

David Clarke, University of Melbourne, Australia;

Multi-camera on-site video technology and post-lesson video stimulated interviews were used in a purposefully inclusive research design to generate a complex data set amenable to parallel analyses from several complementary theoretical perspectives. This presentation reports the results of parallel analyses employing positioning theory, systemic functional linguistics, distributed cognition and representational analysis of the same nine-lesson sequence in a single science classroom during the teaching of a single topic: States of Matter. Without contesting the coherence and value of a well-constructed mono-theoretic research study, the argument is made that all such studies present an inevitably partial account of a setting as complex as the science classroom: privileging some aspects and ignoring others. In particular, this paper examines the rationale for multi-theoretic research designs, highlighting the dangers of the circular amplification of those constructs pre-determined by the choice of theory and outlining the intended benefits of multi-theoretic designs that offer less partial accounts of classroom practice. Illustrative examples are drawn from the results of analyses of the same lesson sequence on the topic ìstates of matterî using the analytical perspectives of positioning theory, systemic functional linguistics, distributed cognition and representational perspectives. Each theory brings with it a vocabulary of terms, through which classroom events and objects can be named, classified and located in relation to the structures privileged by that theory. In this presentation, the goal is to demonstrate how acts of inclusion and exclusion in the research process are enacted through the application of those constructs prioritized by each selected theory.

Methodologies and linguistic repertoires in educational research

Conversation/ Discourse analysis,Organization of educational research(sounds strange),Social aspects of learning,Language (Foreign and second),Primary education,Learning in context

Josephine Moate, University of Jyvaskyla, Finland; Kreeta Niemi, Jyvaskyla University, Finland; Nna Saaskilahti, Jyvaskyla University, Finland;

Language as an object of research has received a significant amount of attention in recent years (e.g. Cazden, 2001; Mercer, 2010), however, the role of language within educational research has only recently started to receive critical attention. It is worth asking, for example, whether different research methodologies rely on and assume particular linguistic repertoires with regard to research participants and, if so, in what ways. The research question underpinning this paper is whether a comparison of different methodologies can reveal different assumptions behind the use of language and the assumed linguistic repertoires of participants in educational research. As a comparative research study, the aim of this paper is to use four different methodologies to analyse the same transcribed dataset from a bilingual classroom. The selected methodologies are: 1) conversation analysis - a methodology that involves detailed transcription and strict criteria for interpretation, 2) a dialogical approach to discourse analysis based on Bakhtinís dialogic

theory (Sullivan, 2012), 3) narrative analysis as an instrument of mind in the construction of reality (Bruner, 1991) and, 4) a sociocultural approach to discourse analysis a mixed-methods approach in which language is viewed as the prime cultural tool (Mercer, 2010). The main focus of the research is not to compare the different findings from this analysis per se, but to critically consider whether the role of language within the analytical process draws on implied or assumed linguistic repertoires of the research participants.

Observing the observer: Learning to fly (when you donít have wings)

Mixed-method research,Synergies between learning, teaching and research,Social aspects of learning,Mathematics,Secondary education

John Kusznirczuk, University of Melbourne, Australia;

Following Maturana (1980), I take it that the ëwordsí we use to influence our own and otherís activity are the words of an observer in interaction with objects and other observers (all ëthingsí) in his or her local ecology. This presentation posits a set of principles, illustrated with practical examples of classroom interaction, for those who would reflect on language, on its limits and its potential, on what it has to offer a ìreflective societyî, and on the possibility of realising ìsynergies between learning, teaching and researchî. The practical examples are drawn from the analysis of data from the Learnerís Perspective Study (Clarke, Keitel, & Shimizu, 2006). This project has provided an extremely useful data set for the fine-grained investigation of social interaction in the classroom. I assert the absolute necessity of education researchersí addressing ìlanguage as an issue,î if they are to have any hope of realising ìreflectiveî societies and ìsynergiesî between learning, teaching and research. I make this claim in the belief that (i) the very possibility of ìreflectionî is mediated and realised by language, and that (ii) ìlearning, teaching and researchî are all bound to knowledge, that is, to the individualís consciousness of the ëthingsí that they point out to others, and that others, in their turn, point out to them, using words. The key elements of my argument and the principles proposed are illustrated by sample analyses of actual classroom data.

The Lexicon Project: Examining the consequences of pedagogical naming systems from different culture

Comparative studies,Synergies between learning, teaching and research,Mathematics,Secondary education,Communities of practice

Carmel Mesiti, International Centre for Classroom Research, Australia; David Clarke, University of Melbourne, Australia;

This presentation draws upon the results of The Lexicon Project, undertaken in Australia, Chile, China, the Czech Republic, Finland, France, Germany, Japan and the USA. This project seeks to document the naming systems employed by different communities, speaking different languages, to describe the events, actions and interactions of the mathematics classroom. It has been observed elsewhere (Clarke et al., 2012) that our research interactions with classroom settings are significantly mediated by our choice of theory. But theories are articulated through language

and the meanings invoked by the use of one language may go unrecognized in another. In particular, the expectation that publication for an international audience must be in English places a serious impediment between any non-English speaking theorist and the international community of researchers. In the Lexicon Project, local teams of researchers and experienced teachers in each country, classify a common set of video records of mathematics lessons, drawn from all participating countries, in order to identify those terms in their local language that in combination constitute the national pedagogical lexicon, by which teachers and researchers discuss, analyze, reflect upon and theorize about the mathematics classroom. This presentation examines the similarities and differences in these national lexicons for the way in which researchers from each country interface with the classrooms that are the focus of their investigations in order to investigate the implications of any differences for both research and for theorizing about classroom practice and consequent learning.

C 18

25 August 2015 15:45 - 17:15

Room Orange_E1

Symposium

Teacher professional development

How much instruction and support do novice and expert teachers need to learn from classroom-videos?

Keywords: In-service teacher education,Pre-service teacher education,Teacher professional development,Video analysis

Sig's: SIG 11 - Teaching and Teacher Education

Chairperson: Marc Kleinknecht, Technische Universitat Munchen (TUM), Germany

Organiser: Eva-Maria Lankes, Technische Universitat Munchen (TUM), Germany

Organiser: Alexander Groeschner, Technische Universitat Munchen (TUM), Germany

Discussant: Niels Brouwer, Radboud University Nijmegen, Netherlands

In the last ten years, classroom videos have become a crucial tool in teacher education and teachers' professional development. Findings from empirical studies suggest that video-based settings have to be sensitive to participants' experiences and pre-knowledge. For example, pre-service teachers with low knowledge need other forms of instructional support and scaffolding to profit from video-based settings than in-service teachers with more prior knowledge and professional experience (Santagata & Guarino, 2011; Seidel, Blomberg & Renkl, 2013; Sherin & van Es, 2005). However, previous research on pre- and in-service teachers' learning from videos

has so far hardly investigated the specific designs of video-based learning in various stages of teacher education and professional development. The symposium focuses on this lack of research and presents effects of video-based approaches in different stages of teacher education and professional development. Based on the findings, the four presentations discuss the role of longitudinal effects of video for the professionalization of teachers and reflect on the question how much instruction and support novices and experts need to learn optimally from video-based settings.

Teaching transformations from video-based induction programs (un)prescribing the learning objects

Qualitative methods,Pre-service teacher education,Reflection,Interdisciplinary,Higher education

Valerie Lussi Borer, University of Geneva, Switzerland; Cyrille GAUDIN, University of Toulouse, France; Lionel Roche, University of Clermont-Ferrand, France; Flandin Simon, ENS de Lyon, France;

The effects of video-based programs on teacher ability to notice are now well documented. However, evidences showing some concrete teaching transformations are still very few, especially because research often focuses on initial education. This contribution presents an exploratory study dealing with the influence of two types of video-based induction programs on trainee teachersí (TT) teaching activity: one prescribing the learning objects (LO) and one not prescribing them. These programs have been designed on the same conceptual frameworkóan activity-based framework for work analysis (Durand, 2013)óbut using different instructional approaches. The first type of program (P1) defines and plans the LO (e.g. craft rules or professional gestures) and TTs are taught by the facilitator through an iterative course. The second type (P2) does not: LO are supposed to emerge during TTsí activity, which is guided by the facilitator in a digital environment. Using observation and self-confrontation interviews, data are collected to document TTsí activity, alternatively during video watching and during teaching. The results highlighted that i) teaching transformations occur in both P1 and P2 provided that TTs live critical experiences; (ii) in P1, TTs tend to transform their activity provided that they experience the practical efficiency of the prescribed LO; (iii) in P1, some teaching transformations occur from unprescribed LO whereas some prescribed LO do not result in teaching transformation; (iv) in P2, sometimes no LO emerge. This study contributes to the empirical evidence showing the effects of video viewing on novice teachersí teaching activity during their induction year.

Fostering professional vision: Who benefits from learning with videos in initial teacher education?

Experimental studies,Mixed-method research,Pre-service teacher education,Reflection,Interdisciplinary

Sandro Biaggi, University of Teacher Training Education, Switzerland; Kathrin Krammer, PH Luzern, Switzerland; Isabelle Hugener, University of Teacher Education, Switzerland;

Professional vision is considered to be a key prerequisite for successful teaching. In order to foster professional vision approaches of case-based learning with classroom videos are given special attention at present. So far little research has been done in relation to the specific effects of video-based reflection about oneís own and othersí teaching on the development of professional vision in initial teacher education. The intervention project VideA (Video Analysis in Teacher Education) investigated the impact of case-based work with oneís own as well as other teachersí videos on professional vision among approximately 150 pre-service teachers. During one term one intervention group worked with videos of their own teaching, while a second intervention group worked with other teachersí videos and a control group worked on the basis of written teaching cases. The changes of professional vision were measured pre-post using the online tool Observer. At the end of term students and lecturers were also questioned with respect to the acceptance and effectiveness of working with videos. Results reveal that students working with videos showed a positive increase in professional vision, in particular those with low initial values. Students and lecturers report a good acceptance and perceived effectiveness of case-based learning. The findings indicate that using own and othersí videos in initial teacher education is helpful, especially for students with low entry levels of professional vision.

Video-based, content-focused learning in teachersí professional development

Experimental studies,Quantitative methods,Teacher professional development,Reflection,Mathematics,Higher education

Nanette Seago, WestEd, United States;

The main goal of the Learning and Teaching Geometry (LTG) project is to build professional development (PD) materials that provide opportunities for teachers to engage in learning about geometric similarity through the use of video cases, in which specific and increasingly complex mathematical ideas are presented within the dynamics of classroom practice. The central component of the LTG materials is the Foundation Module, which includes 30 hours of PD and is intended to provide teachers with a thorough grounding in key mathematical and pedagogical issues related to similarity. Field test data indicate that the Foundation Module supports gains in both teachersí and studentsí knowledge of similarity. In our presentation we will share the theoretical underpinning that guided the design of the LTG PD materials, the conceptual rationale for that design, the research methods and the results. Finally, we will reflect on what we have learned about the nature of instruction and support needed for teacher learning from video-based PD.

Fostering student-teachersí analysis of their own teaching with an online-based video-feedback

Experimental studies,Mixed-method research,Pre-service teacher education,Reflection,Interdisciplinary

Marc Kleinknecht, Technische Universitat Munchen (TUM), Germany; Alexander Groeschner, Technische Universitat Munchen (TUM), Germany;

Empirical findings suggest that pre-service teachers with need more instructional support and direct scaffolding to profit from video-based learning opportunities than in-service teachers. Our study focused on the effects of a strongly structured online- and video-based self-reflection and feedback course on novice teachersí noticing. We used a quasi-experimental design to compare this online- and video-based intervention with a journal writing approach without video-reflection and feedback. Results of a pre-post-test show that the intervention group was more deeply engaged in analysis of positive events than the control group. Evaluation of the written reflections elucidates that student teachersí feedback in the intervention group contains various clues on positive events and alternative actions. The self-reflections at the end of the video-online discourse widely incorporate these clues and contain more analysis of critical events and alternatives than self-reflection at the beginning.

C 19

25 August 2015 15:45 - 17:15

Room Yellow_G3

Symposium

Science education

Approaches to supporting early science and mathematics learning

Keywords: Distributed cognition,Early childhood education,Mathematics,Mixed-method research,Science education,Teaching/instruction

Sig's: SIG 3 - Conceptual Change

Chairperson: Miriam Leuchter, University of Munster, Germany

Organiser: Miriam Leuchter, University of Munster, Germany

Organiser: Henrik Saalbach, University of Leipzig, Germany

Discussant: Elsbeth Stern, ETH Zurich - Research on Learning and Instruction, Switzerland

Means of supporting early science and mathematics learning should refer to children's prior knowledge and stimulate conceptual change. To this aim, verbal and material scaffolds focus children's attention on a phenomenon's essential aspects, model thinking processes, and endorse relevant cognitive processes. Scaffolds may be implemented at home or in the classroom, in one-to-one interactions or in group settings.However, the relation between the quality of scaffolds and children's learning has rarely been investigated. Moreover, recent findings suggest that scaffolding is very rarely used in early educational settings. Lacking scaffolding activities may be related to deficits in teachers' or care-takers' content knowledge, diagnostic skills, or adaptive instructional strategies.The first of the presented studies in the symposium focuses on young

children's coordination of theory and evidence in the context of science and asks if and how this ability may be fostered by adaptive scaffolding interventions with or without modeling.The second study examines differences in early home numeracy experiences between American and Chinese children and their possible effects on discrepancy in children's numeracy skills.The third study investigates Kindergarten teachers' scaffolding strategies in science classes and examines if teachers' content knowledge and beliefs correspond with their scaffolding behavior and children's learning.The last of the presented studies examines how teachers support children's engagement in dialogic interaction and identifies successful strategies in early science and mathematic classes.

Scaffolding pre-school studentsí competencies when reasoning with evidence

Experimental studies,Instructional design,Argumentation,Science education,Early childhood education,Inquiry learning

Ilonca Hardy, Goethe-Universitat Frankfurt, Germany; Simone Stephan-Gramberg, Goethe-Universitat Frankfurt, Germany;

Learners' coordination of their (naive) theories with corresponding evidence has been repeatedly stated as a core goal of science education. Yet, especially younger learners typically conflate empirical and theoretical ideas, not consistently differentiating between them as epistemological categories. In the present study, we investigated whether the coordination of theory and evidence of preschoolers may be fostered by a short intervention based on scaffolding techniques, varying an intervention with scaffolding only (group 1), an intervention with additional modeling of thinking processes (group 2), and a control group without intervention. In individual pre- and posttests, the total of 63 five-year-old children were presented with each three tasks, representing different hypotheses of ballsí bouncing behavior and each four object characteristics which were to be judged as confirming, disconfirming, or irrelevant to a given hypothesis. In the intervention, the children were supported by adaptive prompts with or without prior modeling of advanced thinking processes. Our results show a significant improvement in the reasoning patterns of children in group 2, pointing to the importance of modeling when scaffolding interactions in individual tutorial sessions.

A cross-cultural comparison of early home numeracy activities

Comparative studies,Cultural psychology,Competencies,Mathematics,Informal learning,Learning in context

Joyce Moore, University of Iowa, United States;

Cross-cultural research has found that the mathematics performance of American elementary school children is lower than their Chinese peers. This difference exists at the beginning of first grade, so it is reasonable to assume that earlier factors in childrenís early numeracy development contribute to this gap in mathematical achievement. However, few cross-cultural studies have been conducted to examine early home numeracy experiences among different cultural groups. It is possible that Chinese children have more or a different type of early numeracy experiences at

home. We hypothesize that the Chinese children will engage in more home numeracy activities, and these activities will involve more direct instruction by the caregiver. We will also determine whether the differences in early home numeracy experiences can partly predict any discrepancy in numeracy skills among children in the two groups. Our data include 1) a one-week diary report in which primary caregivers record their child's home numeracy activities, 2) a measure of childrenís numeracy skills assessed using the Individual Growth and Development Indicators of Early Numeracy. The Chinese data has been collected and data collection for the American preschoolers is underway. We will code the home numeracy activities based on mathematics (e.g., counting, quantity comparison), and on context (direct instruction, games, or on-going life activities). A multiple regression will be conducted to see whether the quantity of home numeracy activities, or a particular type or context, can predict part of the variance in numeracy skills among the preschoolers.

Kindergarten teachersí professional knowledge, scaffolding behavior and childrenís science learning

Mixed-method research,In-service teacher education,Conceptual change,Science education,Early childhood education,Inquiry learning

Ueli Studhalter, ETH Zurich, Switzerland; Annelies Elmer, Uniersitat des Saarlandes, Germany; Annette Tettenborn, Institut fur padagogische Professionalitat und Schulkultur, Switzerland; Miriam Leuchter, University of Munster, Germany; Henrik Saalbach, University of Leipzig, Germany;

Teachersí scaffolding is seen as an important factor of instructional quality. However, kindergarten teachers provide only rarely scaffolds intending to stimulate childrenís deep learning. The aim of this study is to investigate kindergarten teachersí scaffolding behavior in early science instruction. Teachersí scaffolding behavior is operationalized by their use of content-specific language and the provision of verbal scaffolds. Specifically, we investigate the relations between teachersí scaffolding behavior, their beliefs and content knowledge and childrenís learning. It is hypothesized that an unfavorable scaffolding behavior is due to teacherís deficit of content knowledge. Classroom videos of thirty-three kindergarten teachers working on a discovery-based learning environment were analyzed by a coding scheme that captures four types of specific scaffolding strategies. The data revealed significant relations between teachersí beliefs and their scaffolding behavior. Further, we found significant relations between teachersí content knowledge (CK) and their use of content-specific language, which underlines the importance of CK for professional education and development. However, no relation was found between teachersí CK and the provision of verbal scaffolds. Further, no relation was found between teachersí scaffolding and childrenís learning.

Scaffolding dialogic interactions in the classroom

Conversation/ Discourse analysis,Teaching/instruction,Argumentation,Mathematics,Early childhood education,Communities of practice

Helena Rasku-Puttonen, University of Jyvaskyla, Finland; Marja-Kristiina Lerkkanen, University of Jyvaskyla, Finland; Anna-Maija Poikkeus, University of Jyvaskyla, Finland;

Classroom dialogue is regarded as crucial for pupilsí learning but dialogic exchanges take place very infrequently in most classrooms. Literature on successful strategies for facilitating dialogic interactions is scant (Howe & Abedin, 2013). There is evident need for research-based evidence on how to scaffold studentsí talk towards educational dialogue that supports understanding and deep learning in classrooms. The aim of our study was to examine how to enhance and maintain classroom dialogue in STEM lessons. This study represents a subsample of a large-scale follow-up study (teachers and their pupils from 6 to 9 years old). The video and audio recordings from classroom situations were analysed using qualitative content analysis. Based on prior findings on kindergarten classrooms we identified three different patterns of promoting dialogic interactions: 1) teachersí facilitating questions provided children opportunities to share their knowledge and experiences, 2) teachersí scaffolding was built on invitations to help each child to participate and teachersí stepwise questioning, 3) teachers maintained discussion which was initiated by childrenís comments or questions and they gave children space and time for sharing their ideas on the topic. Our findings suggest that teachers need concrete models on how to promote dialogic interactions in classroom.

C 20

25 August 2015 15:45 - 17:15

Room Green_A5

Symposium

Mathematics education

Expanding inquiries of spontaneous mathematical focusing tendency within mathematical development

Keywords: Cognitive development,Developmental processes,Mathematics

Sig's: SIG 3 - Conceptual Change

Chairperson: Jake McMullen, University of Turku, Finland

Organiser: Jake McMullen, University of Turku, Finland

Discussant: Minna M Hannula-Sormunen, University of Turku, Finland

Individual differences in the development of mathematical skills have almost exclusively been studied using overtly mathematical tasks. However, a novel approach using non-explicitly mathematical tasks has revealed that not all children equally focus on numerical aspects when not guided to do so. Children's tendency of Spontaneous Focusing On Numerosity (SFON) has

been found to predict individual differences in early numeracy and mathematical development throughout primary school. A higher SFON tendency is thought to trigger more self-initiated practice with numerical skills in children's everyday lives, which leads to advantages in learning mathematics. This symposium includes four empirical studies which build on the previous findings of SFON studies by investigating children's spontaneous mathematical behavior with a variety of mathematical aspects, related to both natural and rational number development. First, Batchelor investigates the relation between SFON tendency during experimental tasks and play situations in four- to five-year-olds. Second, Sharir provides the first evidence of spontaneous focusing on arithmetical series and mathematical patterns in primary school children. Next, van Hoof investigates the impact of spontaneous focusing on quantitative relations on the development of rational number knowledge. Finally, Degrande unpacks the types of quantitative relations primary school students focus on by comparing their spontaneous use of additive and multiplicative relations in parallel versions of a task. This collection of studies suggests that uncovering and modelling this kind of mathematically meaningful perceiving of the surroundings and tasks could be an efficient tool for promoting children's mathematical development and thus prevent later failures in learning mathematics.

Spontaneous focusing on numerosity during child-parent play

Mixed-method research,Student learning,Cognitive skills,Numeracy,Mathematics,Early childhood education

Sophie Batchelor, Loughborough University , United Kingdom; Camilla Gilmore, Loughborough University, United Kingdom; Matthew Inglis, Loughborough University, United Kingdom;

In this study we measured spontaneous focusing on numerosity (SFON) tendencies during child-parent play. We used a mixed methods design to examine (i) childrenís SFON across experimental and play-based settings, and (ii) the relationship between childrenís SFON and their parentsí SFON. Children (aged 4-5 years) and parents took part in two phases of research: first, an observational phase in which they played together with different sets of toys (Play SFON), and second, an experimental phase in which they each completed a picture-based task designed to assess SFON (Task SFON). We found a strong positive correlation between childrenís Task SFON and their Play SFON. Children who initiated symbolic number talk during child-parent play were more likely to spontaneously focus on numerosity on the Picture Task. We found no correlation between childrenís and parentsí Task SFON or Play SFON. This suggests that childrenís SFON does not stem from parental levels of SFON and thus other possible causes or influences need to be examined.

Young children's spontaneous recognition of mathematical structures: Are there gender differences?

Quantitative methods,Student learning,Cognitive skills,Numeracy,Mathematics,Early childhood education

Tal Sharir, Bar-Ilan University, Israel; Nira Mashal, Bar-Ilan University, Israel; Zemira Mevarech, Bar-Ilan University, Israel;

Previous research (e.g., Hannula et al., 2010) indicates that young children can identify small quantities that are presented either visually or auditory, and that these abilities are related to children's mathematics achievements as assessed later on in school. However, little is known at present on the extent to which young children can spontaneously recognize mathematical structures, such as multiplication patterns and arithmetic series. The aim of the present study is, therefore, threefold: (a) to examine young children's tendency to recognize mathematical structures (RMS); (b) to study RMS gender differences; and (c) to test whether boys' and girls' RMS relate to their mathematical reasoning. Participants were 113 Israeli children age 4-5 years old. Children's RMS was assessed both verbally and nonverbally. Results indicated that young children could recognize not only quantities, but also arithmetic series and mathematical patterns. Children scored significantly higher on the non-verbal than on the verbal measurements. No significant differences were found between boys and girls except for the multiplication patterns and the nonverbal assessments ñ on both measures the girls outperformed the boys. Finally, significant correlations were found between boys' and girls' RMS and mathematical reasoning. The theoretical and practical implications will be discussed at the conference.

Spontaneous focusing on quantitative relations as a predictor of rational number development

Quantitative methods,Student learning,Cognitive development,Conceptual change,Mathematics,Primary education

Jo Van Hoof, KU Leuven, Belgium; Tine Degrande, KU Leuven, Belgium; Jake McMullen, University of Turku, Finland; Lieven Verschaffel, KU Leuven, Belgium; Erno Lehtinen, University of Turku, Finland; Wim Van Dooren, KU Leuven, Belgium;

While a good understanding of rational numbers is an essential part of mathematical literacy, research has repeatedly shown that learners have a lot of difficulties dealing with various aspects of rational numbers (e.g. Vamvakoussi & Vosniadou, 2010). Still, little is known about the relevant contributors to learning trajectory leading to rational number understanding (McMullen, Hannula-Sormunen, & Lehtinen, 2014). Recently Lehtinen, McMullen, and Hannula-Sormunen (2014) found that Spontaneous Focusing On quantitative Relations (SFOR) was a unique contributor to the gain of rational number knowledge through instruction, even after controlling for prior knowledge of rational numbers, arithmetic fluency, and non-verbal intelligence. The goal of the present research was to replicate the study of Lehtinen and colleagues (2014) and extend it by controlling for learnersí general mathematics achievement. Results showed that SFOR was indeed a unique contributor to the gain of rational number knowledge through instruction, after taking into account previous knowledge of rational numbers, non-verbal intelligence, math fluency skills, and general mathematical skills. Both studies propose that learners who are more likely to focus on the more mathematically advanced aspect of tasks, such as the quantitative relations in a task, may gain more self-initiated practice with these skills than their peers who may only focus on less advanced aspects. This increase in self-initiated practice

may contribute to mathematical skills development, particularly with regard to concepts related to rational numbers.

Reconsidering SFOR: Characterizing childrenís spontaneous focus on quantitative relations

Quantitative methods,Student learning,Conceptual change,Developmental processes,Mathematics,Primary education

Tine Degrande, KU Leuven, Belgium; Lieven Verschaffel, KU Leuven, Belgium; Wim Van Dooren, KU Leuven, Belgium;

The present study builds on previous studies of McMullen and colleagues about childrenís tendency for Spontaneous Focusing On quantitative Relations (SFOR). We studied what types of quantitative relations make up SFOR, what kind of SFOR-instrument is best suited to capture the range of quantitative relations, and how SFOR evolves with grade. We offered 3 different variants of a SFOR-task (i.e. a multiplicative, an additive or a neutral one), to 315 second, fourth and sixth graders. Results revealed that in all three variants of the task, children spontaneously focused on multiplicative or additive relations. Moreover, the neutral SFOR-task was best suited to capture both multiplicative and additive relational answers. Finally, the focus on multiplicative answers increased with grade for all three tasks, whereas the evolution of additive answers depended on the task variant (i.e. remaining stable in the multiplicative task, but increasing in the additive task and decreasing in the neutral task).

C 21

25 August 2015 15:45 - 17:15

Room Cyan_F2

Symposium

Assessment methods and tools

The Role of Instructional Sensitivity in the Assessment of Student Competencies

Keywords: Achievement,Assessment methods and tools,Learning in context,Psychometrics

Sig's: SIG 18 - Educational Effectiveness

Chairperson: Alexander Naumann, German Institute for International Educational Research (DIPF), Germany

Organiser: Alexander Naumann, German Institute for International Educational Research (DIPF), Germany

Discussant: Eckhard Klieme, German Institute for International Educational Research (DIPF), Germany

This symposium is concerned with the role of instructional sensitivity in the assessment of students' competencies. Assessments of students' competencies and achievement are widely used in educational research and policy. In many cases, results of these tests are more or less explicitly related to the effectiveness of the instruction that students received. In response, many researchers have asserted that construction and evaluation of assessments for diverse educational settings need more information about how tests and items are capable of detecting effects of classroom instruction, which leads to the concept of instructional sensitivity. The four presentations focus on different aspects of instructional sensitivity. The first presentation deals with the validation of the instructional sensitivity of test interpretation as argument evaluation. The second paper addresses the measurement of the instructional sensitivity of items. The third presentation investigates the relationship between the instructional sensitivity of tests and items. Finally, the fourth paper deals with the instructional sensitivity of a German language large scale assessment. Taken together, the presentations aim at improving the understanding of the implications of instructional sensitivity for test interpretation and test construction, fostering the development of indicators and indicator systems to register educational effects at different levels.

Validating the instructional sensitivity of test interpretation as argument evaluation

Psychometrics,Assessment methods and tools,Achievement,Interdisciplinary,Primary education,Learning in context

Maria Araceli Ruiz-Primo, University of Colorado Denver, United States; Min Li, University of Washington, United States;

Instructional sensitivity relates to the inferences made about a test or test item in relation to the instruction students received. An instructionally sensitive item ìreflects student knowledge/ability as the consequence of instructionî (Burstein, 1989, p. 5, emphasis added), that is, what students have learned. At the center of instructional sensitivity then is the question whether a test or test item can differentiate the instruction received by students, based on their performance on that test or test item. That is, ìthe scores produced by an instructionally sensitive test should distinguish accurately between students who have and have not been taught a given content or those who have and have not been effectively taught that contentî (Ruiz-Primo, in press, p. 1). In this paper we propose a framework that can be considered in evaluating the inferences made about instructionally sensitive tests. We focus on the evidence that can potentially support the proposed interpretation of instructional sensitivity of tests or test item. The framework is the result of the research work done in the project, Developing and Evaluating Instructionally Sensitive Assessment - DEISA, funded by National Science Foundation in the US. The paper describes the interpretive arguments, the assumptions, the validity arguments, and the possible sources of evidence to illustrate how key critical proportions in validity claims for instructional sensitivity can be adequately scrutinized.

A cognitive diagnostic modeling approach to instructional sensitivity

Psychometrics,Assessment methods and tools,Achievement,Science education,Primary education,Learning in context

Min Li, University of Washington, United States; Phonraphee Thummaphan, University of Washington, United States; Maria Araceli Ruiz-Primo, University of Colorado Denver, United States;

Assessments have been pervasively used in classrooms by educators and researchers for various purposes from studying the effects of educational innovations to examining the instructional outcomes in a classroom. Scholars have recurrently brought up a concern about the interpretation and use of assessment scores: Are assessments sensitive enough to detect student learning differences due to instruction? If so, do they have formative value for teachers and students? In this paper we will examine the formative value of instructional sensitivity of assessment items from two elementary science modules. In order to determine whether items varying in instructional sensitivity yield different formative values for diagnosing student learning we created booklets with items of different instructional sensitivity (from very close to the module to far proximal to the module), and administered them in 43 classrooms (632 students) using a pretest-posttest design. We will incorporate the cognitive diagnostic modeling analysis to examine the item statistics as well as the model fit in order to evaluate the formative value of items varying in instructional sensitivity.

Linking the instructional sensitivity of tests and items

Psychometrics,Assessment methods and tools,Achievement,Competencies,Primary education,Learning in context

Alexander Naumann, German Institute for International Educational Research (DIPF), Germany; Johannes Hartig, German Institute for International Educational Research (DIPF), Germany;

Although there is standard method to determine the instructional sensitivity of tests, it lacks a common approach to the instructional sensitivity of items that is in accordance with the test level approach. Thus, the present study aims at linking the instructional sensitivity of tests and items. We investigate the relationship between a recently proposed IRT approach to the instructional sensitivity of items and the standard approach to the instructional sensitivity of test scores in a simulation study. Results suggest that selecting items that are flagged as highly instructionally sensitive following the IRT approach results in a higher instructional sensitivity of the test as a whole. That is, on the one hand, the IRT approach to the instructional sensitivity of items appears to be coherent to the approach commonly applied to test scores, and, on the other hand, information on the instructional sensitivity of items might be beneficial to item selection during test construction. Yet, further studies on item properties that influence items' instructional sensitivity are needed.

Evaluating items' instructional sensitivity based on measures of instructional content

Psychometrics,Quantitative methods,Assessment methods and tools,Achievement,Competencies,Learning in context

Jan Hochweber, University of Teacher Education St. Gallen, Switzerland; Alexander Naumann, German Institute for International Educational Research (DIPF), Germany; Johannes Hartig, German Institute for International Educational Research (DIPF), Germany;

Although various approaches to operationalize instructional sensitivity (IS) have been proposed, a widely shared assumption is that to establish IS, indicators of IS should be related to actual measures of instruction, among others, of the contents students have been exposed to during instruction. While some studies have examined the relationships between studentsí test scores and content of instruction to make inferences about IS, research focusing on the item level is scarce. However, to consider IS in the process of test construction, it is crucial to obtain information about the IS of individual items and not merely at the level of test scores. Our study had two aims: a) to investigate the relationship between indicators of itemsí IS and teacher reports of the content taught in Grade 9 German language courses, based on a 34-item test of studentsí language awareness; and b) to demonstrate the use of the LML-DIF model (Naumann, Hochweber, & Hartig, in press), which provides a statistically sound way to gather evidence on IS for item responses and test scores. Results showed that eight itemsí difficulty at T1 and two itemsí change in difficulty between T1 and T2 was negatively related to the implementation of language awareness content. This provides indication that about one third of the considered items may be classified as instructionally sensitive regarding the coverage of language awareness content. This information about itemsí IS can be highly relevant, as it allows, among others, to purposefully select items that fit the intended area of test application.

C 22

25 August 2015 15:45 - 17:15

Room Purple_H4

Symposium

Metacognition and reflection

Metacognitive Judgments in Self-regulated Learning Contexts

Keywords: Achievement,Experimental studies,Metacognition,Self-regulation

Sig's: SIG 16 - Metacognition

Chairperson: Elisabeth Pieger, University of Wuerzburg, Instructional Media, Germany

Organiser: Elisabeth Pieger, University of Wuerzburg, Instructional Media, Germany

Organiser: Christoph Mengelkamp, University of Wuerzburg, Germany

Discussant: Anique de Bruin, Maastricht University, Netherlands

Metacognitive judgments are of high educational significance. Many theories of self-regulated learning suppose that judgments play a role for the learning process and thus for performance. Judgments are part of monitoring, which is one important component of metacognition besides control. "[M]onitoring refers to the subjective assessment of one?s own cognitive processes and knowledge, whereas control refers to the processes that regulate cognitive processes and behavior" (Koriat, Ma'ayan, & Nussinson, 2006, p. 38). To be able to adequately control one?s own learning behavior (e.g. selection of items or allocation of study-time), accurate metacognitive judgments are a prerequisite. However, judgments have often been found not to be very accurate: learners are often overconfident. Thus it is important to investigate, how the accuracy of judgments can be enhanced and how this can be realized in educational contexts. The aim of the symposium is to investigate metacognitive judgments in self-regulated learning contexts. Thereby different kinds of judgments like Ease of Learning Judgments, Judgments of Learning, and Confidence Judgments before and during the learning process are concerned. Further different learning materials, like learning with texts, learning with multimedia, learning difficult concepts, and learning from problems, are investigated. Moreover task characteristics (e.g. learner- vs. program-controlled instruction) and learner characteristics like prior knowledge, age, and reading comprehension ability are taken into account. In sum, the aim of the symposium is to investigate how these differences in learning tasks, learning procedures and learner characteristics affect judgments and their accuracy.

Judgments in Metacomprehension ñ Does letter deletion reduce overconfidence and enhance performance?

Experimental studies,Student learning,Metacognition,Reading comprehension

Elisabeth Pieger, University of Wuerzburg, Instructional Media, Germany; Christoph Mengelkamp, University of Wuerzburg, Germany; Maria Bannert, Mensch-Computer-Medien, Germany;

Students are often overconfident when predicting their own performance, but accurate monitoring is important for adequate control of the learning processes to reach better performance. To be able to make realistic plans and to invest enough effort, it is important that students make accurate judgments already before starting to learn. Thus the aim of our study is to investigate if learning with deleted-letter-texts affects judgments before and during the learning process. We expect lower judgments and deeper processing of texts with deleted letters which should result in better performance. To test these assumptions students learned either with deleted-letter-texts or with intact texts. These texts were first presented for 2 seconds and students made Ease of Learning Judgments (EOL1). Afterwards they read the texts once and made EOL2 and Judgments of Learning (JOL1). Then they were allowed to learn from the texts and afterwards made JOL2. Finally a knowledge-test with Retrospective Confidence Judgments (RC) followed. Results show that presenting and reading deleted-letter-texts once, lead to significantly longer reading-time, lower EOL and JOL. Further, students show better monitoring accuracy of JOL2 after learning, although there was no significant difference for learning-time. However, deleted-letter-texts did not lead to better performance. Thus further research is required to test if students base control on their judgments and if better monitoring leads to better control and better performance.

Multimedia effects at repeated studying and testing: Evidence for adaptation to task demands

Experimental studies,Instructional design,Comprehension of text and graphics,Metacognition,Reading comprehension,Multimedia learning

Alexander Eitel, Knowledge Media Research Center, Germany; Katharina Scheiter, Knowledge Media Research Center, Germany;

The present research investigated how learning with multimedia (the multimedia effect) is affected on a process- and outcome-level when studying and testing is repeated. Learning with multimedia can be supported if studying and testing is repeated, because initial overconfidence due to multimedia (judged learning better than actual learning) can be overcome, thereby increasing study effort (Hypothesis 1), and because re-learning can be adapted to the demands of the preceding test, thereby optimizing the processing of text and pictures to support learning (Hypothesis 2). To test these assumptions, 52 participants learned with either text only or multimedia (text and pictures) about the toilet flushing system while their eye movements were recorded, provided JOLs, and took tests for recall and transfer. This study-JOL-test cycle was then repeated. On a process-level, unlike expected from Hypothesis 1, overconfidence due to multimedia was not reduced from the first to the second study-test cycle. However, as expected by Hypothesis 2, eye movement analyses revealed a more balanced attention distribution between text and picture processing in the second than in the first study-test cycle, which was in turn related to better performance, hence suggesting that students adapted to task demands in multimedia learning. On an outcome-level, learning with multimedia led to better test performance than learning with text only in both study-test cycles, suggesting that multimedia effects remain stable across repeated studying and testing episodes.

Individual and developmental differences affect childrenís monitoring accuracy and study selections

Quantitative methods,Developmental processes,Metacognition,Self-regulation,Primary education

Mariette van Loon, Maastricht University, Netherlands; Anique de Bruin, Maastricht University, Netherlands; Jimmie Leppink, Maastricht University, Netherlands; Claudia M. Roebers, University of Bern, Switzerland;

This study investigated childrenís (N = 167, grade 3 ñ 6) monitoring accuracy and restudy selections when studying difficult concepts. To make adaptive study selections (i.e., leading to the best possible learning outcomes), they should accurately monitor which materials are not yet well-known, and then decide to further study these materials. We investigated to what extent the factors Age, Prior Knowledge, Reading Comprehension Ability, and Sentence Generation Task Responses predict monitoring accuracy (level of overconfidence) and the effectiveness of restudy selections. Findings reveal that younger learners are more overconfident, and that reading comprehension ability and prior knowledge are related to overconfidence. Further, when learners were more overconfident, their restudy selections were less adaptive. These results

provide evidence that it is important to take developmental differences and individual differences in reading comprehension ability and prior knowledge into account.

The effects of metacognitive judgments on performance in learner-controlled environments

Educational technology,Metacognition,Problem solving,Self-regulation

Loredana Mihalca, Webster University Geneva , Switzerland; Christoph Mengelkamp, University of Wuerzburg, Germany;

Although learner-controlled instruction enables students to set their own learning trajectory, this only leads to equal or slightly better performance than program-controlled instruction (Kraiger & Jerden, 2007). A possible explanation for why learners do not benefit from learner control is that they are unable to accurately monitor their performance and select appropriate learning tasks. Low prior knowledge students are more likely to perform poorly under learner control, not only because of their lack of prior knowledge, but also because of their inaccurate judgments about their own knowledge (e.g., Ease of Learning - EOL; Judgments of Learning ñ JOL; Retrospective Confidence Judgments - RCJ). The purpose of this study was to provide insight into the differences in metacognitive judgments and their accuracy of low and high prior knowledge students studying in two different versions of learner-controlled environments (full vs. restricted learner control). In addition, it was investigated whether the accuracy of these metacognitive judgments predicts performance in genetics and task selection. Results indicated that the accuracy of RCJs and EOLs in training predicted post-test performance, and the accuracy of RCJs was more important for full learner control than for restricted learner control. However, RCJs and EOLs in training did not predict either the number of problems selected during the training (i.e., task selection) or the time spent on training.

C 23

25 August 2015 15:45 - 17:15

Room Blue1_C1

Symposium

Researcher education

Frameworks for the career development of researchers in a changing doctoral landscape

Keywords: Competencies,Doctoral education,Learning approaches,Researcher education,Synergies between learning, teaching and research

Sig's: SIG 14 - Learning and Professional Development

Chairperson: Campbell Reid, University of Strathclyde, United Kingdom

Organiser: Claire Jackson, University of Strathclyde, United Kingdom

Organiser: Margaret Kiley, Australian National University, Australia

Discussant: Thomas Jorgensen, European University Association, Belgium

Over the last decade, the traditional doctorate has been reconceptualized globally (Park, 2005) with government agendas increasingly emphasizing the individual's professional development process whilst undertaking research. Not only are students expected to become masters of their subject area, but emerging doctoral models such as the structured PhD, aim to develop a range of career-enhancing competencies and skills that go beyond the knowledge and techniques required for research within academia. This symposium aims to bring together research looking at various elements within the PGR lifecycle which have a role in supporting the career development of research students, including supervision, formal education and skills training. Each study informed the development of, or analyzed empirically-based frameworks, which diversify conventional structures to better integrate and elevate the critical skills training component. Studies of frameworks from the four contributing countries will be presented, highlighting the opportunities and challenges of structured, semi-structured and flexible frameworks in the context of curriculum within the doctorate. A comparative discussion will focus on how the nature of each approach supports a highly individualized learning experience, and how this can be optimized to support enhanced career prospects so every researcher's aspirations count.

Rethinking professional development for doctoral supervision

Mixed-method research,Researcher education,Writing/Literacy,Doctoral education,Integrated learning

Marcia Johnson, The University of Waikato, New Zealand;

This presentation will describe case study findings from a qualitative research project into threshold concepts (TCs) in the New Zealand tertiary education context. My curriculum focus was doctoral writing ñ specifically the places where students get ìstuckî and are unable to make writing progress ñ with a view to helping both students and supervisors better understand writing and supervisory needs. Interview and survey data were collected from students and supervisors based in New Zealand, Canada, and the UK. From the student data two TCs related to doctoral writing emerged: "Talking to think" as a strategy for developing clarity in writing and self-efficacy ñ the belief in one's ability to overcome writing barriers and become an independent academic researcher, as critical aspects of the doctoral curriculum. Those two TCs then provided an organising framework for the supervisor findings and for a discussion of supervisor professional development needs. Key findings from the supervisor data indicated that none of the supervisors had received formal training, but that all had developed supervisory skills ëon the jobí. Further, supervisors complained that the professional development opportunities that did exist were prescriptive and focused on regulations. There was nothing to help supervisors understand how to address studentsí writing needs or understand the changing environment of higher degree education in the 21st century. The presentation will conclude with discussion of how professional development could be improved to include information about more diverse

models of supervision, writing support, and student skills development within an overall framework of doctoral education.

The role of curriculum to support different models of doctoral education and alternative career path

Mixed-method research,Researcher education,Learning approaches,Doctoral education

Margaret Kiley, Australian National University, Australia;

Arising from a national research project related to the possible introduction of coursework into the Australian PhD, this paper outlines the findings that demonstrate the complexity of the doctorate in curriculum terms. Even questioning something as supposedly straight-forward as the aims of doctoral education highlights the different perspectives involved e.g. the views of candidates, institutions, funding bodies just to name a few. The research involved six different Australian universities with interviews with Deans of Graduate Studies, extensive workshops and focus groups in two of the universities, an online survey of candidates in five of the institutions, analysis of a different approach in one of the six universities, and workshops with over 100 colleagues in the mainland states of Australia. The findings from this study indicate that staff hold passionately to the view that a PhD is a highly individualised learning/teaching experience which leads to a number of curriculum challenges which will be highlighted in other papers in this symposium. One particular finding from the research of relevance to this paper is the response from candidates regarding the additional support they felt they needed during candidature to assist them in their career aspirations. Most commonly reported was help required in being able to relate doctoral research to employer requirements.

Flexibility and sustainability within a structured doctoral framework

Qualitative methods,Researcher education,Learning approaches,Doctoral education,Integrated learning

Lisa Looney, Dublin City University, Ireland; Tracy Dixon, Dublin City University, Ireland;

Doctoral training is one of the priorities to build a European Research Area (ERA) (EC, 2012) , and a number of formalised, sometimes multi-institutional, doctoral training programmes have emerged in Ireland in recent years. Funding agencies increasingly require that doctoral students undertake structured training, yet funding constraints necessarily limit the number of student places available on such programmes. The operational challenges and resource demands of the cohort-based approach can also hinder their long-term development and expansion. To facilitate the accessibility of structured education to its broader doctoral community, Dublin City University (DCU) has introduced a non-mandatory framework that aims to offer a universal standard of training for all research students, irrespective of funding, discipline or School affiliation. The DCU Doctoral Education Framework has a sustainable cost structure and a flexible structured component with a strong disciplinary influence that leaves the selection of specific training elements with the student and their supervisor. Training options include accredited and non-accredited activities in discipline-specific topics, research methods and

transferable skills, and industry-based and inter-institutional options. The range of options enables each DCU research student to build their own bespoke doctoral experience, and create a customised mosaic based on their specific training needs and career aspirations. In developing the Framework, DCU has incorporated the best of the master-apprentice PhD model, while embracing elements of the enriched, structured doctoral education experience. The Framework has been built on the principles of flexibility, sustainability, and parity of opportunity, and has seen increasing levels of engagement since inception.

Applying career aspirations to the design of a flexible skills-based curriculum in the doctorate

Mixed-method research,Researcher education,Competencies,Learning approaches,Doctoral education,Integrated learning

Campbell Reid, University of Strathclyde, United Kingdom; Claire Jackson, University of Strathclyde, United Kingdom; Craig Young, University of Strathclyde, United Kingdom;

Despite recent efforts to track the career destinations of UK doctorates, there is a lack of evidence-base relating to the career aspirations of students when starting a PhD. Without this information, the higher education sector struggles to provide high quality training that meets individual ambitions, considers employee requirements, and provides a consistent experience regardless of research programme. Using the University of Strathclydeís PG Certificate in Researcher Professional Development (PG Cert RPD) ñ a novel and flexible curriculum model undertaken alongside the traditional PhD ñ this research aims to understand the career aspirations of doctoral students enrolled on the PG Cert RPD and to establish any connection between these goals and the training opportunities selected to meet awardís requirements. Exploratory statistics and clustering analysis were applied to questionnaire responses to assess the homogeneity of training choices within research area, department or career aspiration. Semi-structured interviews of a sub-set of respondents further explored perceptions of employer requirements, and the utility of the PG Cert RPD. Changes in the UK doctoral landscape have resulted in universities taking innovative approaches to curriculum development to ensure flexibility and embed transferable skills training. New models of doctoral training to develop career-ready graduates expect students to match their development to their preferred career destination without providing adequate career path information. This study forms part of a longer-term project to define career pathways for students that maximizes the development potential from the training options within the PG Cert RPD, harmonizing the career aspirations of students with employer requirements.

C 24

25 August 2015 15:45 - 17:15

Room Green_A6

Symposium

Learning in context

Intergenerational transmission of academic values, cognitions, and emotions

Keywords: Attitudes and beliefs,Developmental processes,Emotion and cognition,Learning in context,Motivation and emotion,Parental involvement in learning

Sig's: SIG 8 - Motivation and Emotion

Chairperson: Urs W. Grob, University of Zurich, Switzerland

Organiser: Urs W. Grob, University of Zurich, Switzerland

Discussant: Sabine Walper, German Youth Institute, Germany

In childhood and adolescence, parents have a remarkable potential to influence their children's academic values, cognitions and emotions, both knowingly and unknowingly. This symposium focuses on such influences especially in the form of intergenerational transmission. It comprises papers based on four major studies, two of which were conducted in the USA (Childhood and Beyond (CAB); Michigan Study of Adolescent and Adult Life Transitions (MSALT)), one in Australia (Study of Transitions and Education Pathways (STEPS)), and one in Germany (Lebensverlaeufe ins fortgeschrittene Erwachsenenalter (LifE)). The longitudinal designs of these studies and the advanced data analysis techniques applied allow for a more accurate assessment of parental influences. By enriching the core transmission model with crucial mediators (e.g. child's perception of parental beliefs, parents' and child's self-concepts) and moderators (e.g. gender of parent and child, parental involvement) the papers not only add to the knowledge of parental influences on the academic outcomes of their children in general, but also contribute to the theory development regarding the actual processes, and the intervening as well as interacting factors. Some of the differences between the papers, e.g. with respect to the moderating effect of gender, show that such interactions depend on the content dimension, too, and that any expectation of simple transmission mechanics may be too simple.

Parental beliefs, studentsí task values and career aspirations in math and English

Quantitative methods,Student learning,Parental involvement in learning,Secondary education,Motivation and emotion

Rebecca Lazarides, Technische Universitat Berlin, Germany; Helen Watt, Monash University, Australia;

This study examines the effects of student-perceived fathersí and mothersí beliefs (ability expectations; value beliefs; difficulty beliefs) on studentsí (gendered) motivational beliefs (task values, expectancies of success) as well as on their career aspirations in mathematics and English. Data were analyzed from 459 secondary students (262 boys) from three coeducational government secondary schools in Sydney, Australia. Results confirmed that girls reported particularly lower intrinsic value, expectancies of success and career aspirations than boys in mathematics; and, lower success expectancies in English. Fathersí and mothersí beliefs predicted career aspirations in mathematics, but not in English. Different dimensions of fathersí and

mothersí beliefs were important for studentsí motivational beliefs in mathematics and English, and for their career aspirations in mathematics. The results point out the importance of considering the unique effects of fathersí and mothersí beliefs on studentsí career aspirations in mathematics.

Parent-adolescent transmission of academic task values and the role maternal involvement

Quantitative methods,Student learning,Parental involvement in learning,Language (L1/Standard Language),Mathematics,Motivation and emotion

Burkhard Gniewosz, Ludwig-Maximilians-Universitat (LMU), Germany; Jacquelynne Eccles, University of California, Irvine, United States;

The present study focuses on the parent-to-adolescent transmission of academic task values. Transmission is suggested to operate through social learning processes. The study is based on a longitudinal data set comprising 2127 early adolescents. Structural equation models point to indirect maternal transmission effects on the adolescentsí values mediated through the adolescentsí perceptions of their parentsí values. These transmission effects were stronger if the mothers were more involved in their offspringís lives. This increased value transmission was linked to more accurate perceptions of the parentsí values. This pattern of results likely reflects higher levels of maternal involvement fostering academic value transmission by providing sufficient information through parental behaviors to make parental values clear to the adolescents.

Parental influences on their childrenís achievement related beliefs, motivation, and engagement

Quantitative methods,Student learning,Attitudes and beliefs,Educational attainment,Social aspects of learning

Jacquelynne Eccles, University of California, Irvine, United States; Burkhard Gniewosz, Ludwig-Maximilians-Universitat (LMU), Germany; Fani Lauermann, University of Bonn, Germany;

In the family socialization component of Ecclesí expectancy-value theory of achievement-related behaviors (EEVT), Eccles and her colleagues hypothesized that parentsí beliefs about their children during childhood predict adolescentsí achievement-related choices through a series of processes that play out over time. Specifically, parentsí beliefs predict parentsí behaviors, which in turn, predict youthsí motivational beliefs, and youthsí motivational beliefs, which in turn predict their behaviors. Using data from the Childhood and Beyond Study (92% European American; N = 723), we tested these predictions by looking at the relations among parentsí beliefs, parentsí behaviors, youthsí beliefs, and youthsí choices in sports, music, math, and reading across a 12-year period. In this presentation, we will discuss our findings related to the following two important theoretical debates as well: 1) bidirectional influences, and 2) child gender as a moderator. The cross-lagged models support the direction of influence described in the expectancy-value model for both mothers and fathers with influences flowing primarily from

the parents to the children during the elementary years. Furthermore, the findings suggest that (a) all relations are stronger in the leisure domains than the academic domains, and (b) the relations did not consistently vary based on youth gender.

Intergenerational transmission of performance anxiety over 30 years

Quantitative methods,Developmental processes,Emotion and affect,Secondary education,Learning in context,Motivation and emotion

Katharina Maag Merki, University of Zurich, Switzerland; Urs W. Grob, University of Zurich, Switzerland;

Several studies point to the importance of parental influence on the development of performance anxiety (PA) of adolescents; they have examined the transmission processes mostly in cross-sectional or longitudinal analyses with short intervals. However, longitudinal studies that examine the transmission of PA over a very long period of time are missing. In this paper, the following questions will be discussed: To what extent is PA in school transmitted intergenerationally in a cross-sectional and longitudinal perspective of 30 years? Are these influences mediated by the childrenís self-concept of ability? Do hereby dyad-specific differences become apparent? According to the control-value theory and drawing on previous empirical results, we expect intergenerational and dyad-specific transmission effects, mediated by the childrenís self-concept of ability. The hypotheses are analysed based on data of the LifE-Study in Germany (N=579 dyads). Path analyses for the whole sample and for every single dyad were conducted. Differences between the dyads are analysed by multi-group comparisons. Data from 1982 to 2012 will be considered. Our analyses show the importance of investigating long-term and dyadic-specific transmission effects. They confirm gender-specific effects, showing that the PA of daughters is closer related to the PA of their parents than it is the case for sons. Additionally, daughtersí self-concept of ability mediates the long-term transmission. Contrary to our expectation, there is a negative impact of fathers on daughtersí. Theoretical and practical implications will be discussed.

C 25

25 August 2015 15:45 - 17:15

Room Yellow_G4

Symposium

Instructional design

Design Collaborations: Contexts for Researcher and Teacher Learning

Keywords: Communities of practice,Design based research,Researcher education

Sig's: SIG 14 - Learning and Professional Development

Chairperson: Susan Goldman, University of Illinois at Chicago, United States

Organiser: Eleni Kyza, Cyprus University of Technology, Cyprus

Organiser: Iris Tabak, Ben-Gurion University of the Negev, Israel

Discussant: Adam Lefstein, Ben-Gurion University of the Negev, Israel

Aims: This symposium examines theoretical, empirical, and practical perspectives on learning that occurs in the context of design collaborations among teachers and researchers. The general goals of such design collaborations are two-fold: to create effective learning environments that enhance educational opportunities for students; to serve as learning contexts for researchers and teachers. Although, there is a substantial literature on teacher learning and professional development (e.g., van Driel, et al., 2012), we are unaware of a comparable literature related to researcher learning. The four papers in this symposium, present analyses of the affordances such collaborations provide for teachers and researchers to deepen their understanding of what they teach, how students learn it, and how they themselves learn. Conditions of collaborations that lead to more and less effective learning outcomes are also discussed. The presentations reflect design collaborations conducted in four different countries across a range of disciplinary content areas and student age groups. Significance: Design collaborations can produce generative designs for learning that are theoretically sound and empirically grounded in classroom practices. Therefore, they have the potential to produce student learning experiences and outcomes that are more robust and sustainable than those resulting from programs created by others and handed to teachers to implement. Understanding design collaborations from the perspective of researcher and teacher learning can serve to bridge the gap that has historically existed between research and practice, and in so doing connect "knowing how" with "knowing why," or what Bereiter (2014) refers to as Principled Practical Knowledge (PPK).

Boundary crossing and empowerment during teacher-researcher collaboration: A case study

Qualitative methods,Instructional design,Researcher education,Teacher professional development

Eleni Kyza, Cyprus University of Technology, Cyprus; Iolie Nicolaidou, Cyprus University of Technology, Cyprus;

Teacher-researcher collaborations can inform and validate theory building about learning and teaching in real-world environments, and have a direct impact on teacher and student learning. While researchers and teachers belong to different communities of practice they also need to reach common ground in order to pursue their distinct yet related agendas. We use the construct of boundary crossing to study the interactions of teachers and researchers, identifying the boundary ìas a sociocultural difference leading to discontinuity in action or interactionî (Akkerman & Bakker, 2011, p.135). The collaborative design, enactment and research of inquiry-based, online learning environments for science learning served as the boundary object (Star & Griesemer, 1989) allowing the possibility for boundary crossing. We identified episodes

of discontinuity and boundary crossing between teacher and researchers, as evidenced through reflective conversations with the teacher over cycles of design-based research. Data were collected over a period of three years and consisted of interviews and lesson planning sessions with one teacher. The dialogical interaction analysis of the data helped us characterize the nature of boundary crossing and examine teacher and researcher learning. The temporal analysis of the teacherís reflections on collaborating with researchers indicated patterns of empowerment and disempowerment, connected to the researcher actions. These findings were triangulated by field notes taken from classroom videos and collaborative design meetings. Our findings provide a better understanding of teacher-researcher learning when engaged in co-design and have implications on creating sustainable educational innovations.

Teacher-researcher learning from collaborative designs for evidence-based argumentation instruction

Design based research,Quantitative methods,Researcher education,Teacher professional development

Susan Goldman, University of Illinois at Chicago, United States; MariAnne George, University of Illinois at Chicago, United States;

Collaborative design teams of teachers and researchers in three different content areas ñ science, history, and literature ñ engaged in iterative cycles of design-based research over a four year period. The designs, focused on evidence-based argument from multiple sources of information, were implemented by design team teachers, and documented by researchers. Reflective discussions of the what, how, what happened, and why of the implementations constituted the focus of twice-monthly design team meetings and generated revisions to the designs. The design, implementation, and reflection process generated powerful learning contexts for researchers and teachers alike. Two learning themes were pervasive: formative assessment as a lever for focusing on what students were learning rather than what was being taught or researched; and the challenge of engaging students in the intellectual work of inquiry over extended periods of time. The importance of collaborative design for bringing together theoretical and practical dimensions of learning environments is discussed.

Principled practical knowledge through productive tension in teacher-researcher design teams

Design based research,Qualitative methods,Researcher education,Teacher professional development

Iris Tabak, Ben-Gurion University of the Negev, Israel; Samira Nasser, Ben-Gurion University, Israel; Itay Asher, Office of the Chief Scientist of the Ministry of Education, Israel;

This paper examines how implementation-focused concerns and theory-focused concerns enter into design discussions when teachers and researchers collaborate on the design of web-based scientific inquiry learning environments. The presence of both of these concerns, and their admission into design decisions, contribute to the design of more effective learning

environments. Moreover, they enable the production of Principled Practical Knowledge (PPK) (Bereiter, 2014). That is, knowledge that includes facets of how to achieve instructional goals ("know how") and of why these means are effective ("know why"). The inclusion of "know why" beyond the pragmatics of "know how," enables effective adaptation to other settings, which is key to the dissemination of educational innovation. In isolation, researchers may tend to focus on theory, at the expense of implementation detail, while teachers may tend to focus on enactment, at the expense of articulating principles that underlie these emergent effective practices (Langley & Eylon, 2001). A design that is the product of the amalgam of these voices is more likely to reflect pedagogical innovation as well as procedures that are amenable to classroom practice. It is also more likely to yield design principles that can inform practice beyond the immediate implementation context. If we are cognizant of these voices, and of the way they interact, then we have the potential to produce PPK and to increase our capacity for the effective dissemination of educational innovation.

Design researcher learning through and for collaboration with practitioners

Design based research,Researcher education

Saskia Brand-Gruwel, Open University, Netherlands; Susan McKenney, Open University NL, Netherlands;

Design research is a genre of inquiry in which the iterative development of solutions to problems in practice provides the setting for scientific inquiry. To conduct ecologically valid studies that also yield relevant and usable solutions, design research is carried out together with practitioners in authentic learning settings ñ not laboratories. Researchers and practitioners collaborate to analyze the problems being tackled, and to develop and refine solutions, which are informed by (formative) evaluation along the way. In these studies, the function of the investigator typically extends beyond the role of researcher, to include: consultant, designer, and/or facilitator. While most design researchers are afforded formal opportunities to develop their research skills (e.g. through seminars and courses on research design, interview techniques, data analysis, etc.), the consultant, designer and facilitator skills receive far less explicit attention and tend to be learned informally, at best. If design research is to realize its potential contribution to the field of learning and instruction, then explicit attention must be given to developing researcher learning to joins the skills of rigorous investigation with those of consultant, designer and facilitator. The proposed paper briefly discusses the goals, nature and processes of design research before turning attention to the skills required in each phase. The paper presents a framework for design researcher learning that takes place through, and stands to benefit, collaboration with practitioners. Implications for supporting design researcher learning are also discussed.

C 26

25 August 2015 15:45 - 17:15

Room Green_A7

Symposium

Early childhood education

A closer look at teacher-child interactions in early childhood classrooms

Keywords: Early childhood education,Interdisciplinary,Learning in context,Social aspects of learning,Teaching/instruction

Sig's: SIG 5 - Learning and Development in Early Childhood

Chairperson: Lotte Henrichs, Utrecht University, Netherlands

Organiser: Lotte Henrichs, Utrecht University, Netherlands

Organiser: Mayra Mascareno, University of Groningen, Netherlands

Discussant: Marja-Kristiina Lerkkanen, University of Jyvaskyla, Finland

A growing body of research has established that teacher-child interactions are the most important driver of child development in early education settings. The widely used conceptualization of quality of teacher-child interactions is the Teaching through Interactions framework (Hamre et al., 2013), which distinguishes Emotional, Organizational and Instructional Support as the central domains of classroom interaction. Studies have consistently revealed that good quality interactions in these domains have positive within- and cross-domain effects on child development (Downer, Sabol, & Hamre, 2010). While this general evidence sets a precedent for understanding and assessing quality of early childhood classrooms, it has also opened up avenues for further explorations. This symposium takes a more nuanced examination on the quality of teacher-child interaction as conceptualized by the Teaching through Interactions framework, and its relationship to child development in early education settings. The hypotheses tackled here are: Teachers may not provide the same level of quality in all three domains; Teachers may have different beliefs about supporting classroom practices; Quality of interaction and the possibilities to improve it may differ across different classroom activities; The effect of quality of interactions on child outcomes may depend on child characteristics.By means of four studies based in four different countries and an overarching discussion, this symposium aims to expand our understanding of factors that affect classroom interaction and its relationship to child outcomes. In doing so, it advances on more nuanced implications for the practice and improvement of early childhood education, and it traces interesting lines for further exploration.

Classroom quality profiles of kindergarten classrooms in Finland

Quantitative methods,Teaching/instruction,Competencies,Interdisciplinary,Early childhood education,Learning in context

Marja-Kristiina Lerkkanen, University of Jyvaskyla, Finland; Anna-Maija Poikkeus, Department of Teacher Education, University of Jyvaskyla, Finland, Finland; Eija Pakarinen, University of Jyvaskyla, Finland; Martti Siekkinen, University of Eastern Finland, Finland; Maritta Hannikainen, Department of Education, University of Jyvaskyla, Finland, Finland; Pirjo-Liisa

Poikonen, Department of Education, University of Jyvaskyla, Finland, Finland; Helena Rasku-Puttonen, University of Jyvaskyla, Finland; Jenni Salminen, University of Jyvaskyla, Finland;

The present study examined classroom quality profiles of kindergarten classrooms with respect to teacher-child interaction. Observations of the domains of Emotional Support, Classroom Organization, and Instructional Support were conducted in 49 Finnish kindergarten classrooms (for 6ñyear-olds) utilizing the Classroom Assessment Scoring System (Pianta, LaParo, & Hamre, 2008). In addition, questionnaire data on classroom and teacher characteristics, as well as Early Childhood Classroom Observation Measure (Stipek & Byler, 2004) observational ratings, were used in the analyses. Latent profiling analysis was utilized to identify different profiles of classroom quality. Four latent profiles of classroom quality were identified that differed from one another most clearly in the CLASS domain of Emotional Support. Profile 1 represented a generally high level and Profile 4 a generally low level of classroom quality compared to the other profiles, whereas the medium-quality Profiles 2 and 3 showed varying levels of support in the assessed dimensions of quality. Only a few differences emerged among the profiles in classroom and teacher characteristics: The teachers in Profile 4 provided the least literacy instruction and had the least amount of work experience of all of the teachers. The findings using the ECCOM indicated that child-centered practices were predominant among the profiles of higher classroom quality. The results will be discussed in relation to different combinations of teachersí support which indicate differences in observed quality from classroom to classroom. Furthermore, it will be discussed how this knowledge could be used to equalize the differences by recognizing kindergarten teachersí professional strengths and weaknesses.

Quality of classroom interactions and teachersí ideas about practices to promote peer relationships

Mixed-method research,Teaching/instruction,Social interaction,Interdisciplinary,Early childhood education,Learning in context

Ana Gamelas, University of Porto, Portugal; Joana Cadima, Faculty of Psychology and Education Science, University of Porto, Portugal, Portugal; Cecilia Rosario Aguiar, ISCTE ñ University Institute of Lisbon, CIS-IUL, Portugal, Portugal; Margarida Fialho, ISCTE ñ University Institute of Lisbon, CIS-IUL, Portugal, Portugal; Nadine Gomes Correia, ISCTE ñ University Institute of Lisbon, CIS-IUL, Portugal, Portugal;

In this study, using a mixed-method approach, we investigated whether the quality of classroom observed interactions in inclusive preschool settings varies across different teachers profiles based on their ideas on promoting positive relationships. Participants were 43 preschool classrooms and respective teachers. Classrooms were observed through the Classroom Assessment Scoring System, (CLASS; Pianta, La Paro, & Hamre, 2008. Teachersí ideas were analyzed using Q methodology. Seven teachersí ideas profiles were found. Analyses of variance (ANOVAs) determined that CLASS domains (Emotional Support, Classroom Organization, Instructional Support) covaried with teachersí profiles. The quality of teachersí practices will be discussed highlighting the content of these profiles.

CLASS based professional development of kindergarten teachers: Effects vary over activities

Action research,Teacher professional development,Developmental processes,Interdisciplinary,Early childhood education,Learning in context

Lotte Henrichs, Utrecht University, Netherlands; Paul Leseman, Utrecht University, Netherlands;

The current paper reports on the (differential) effect of professional development of kindergarten teachers. In an action research design (close collaboration between practitioners and researchers) classroom quality in kindergarten classrooms was assessed at two measurement times using the CLASS tool (CLASS; Pianta et al 2008). CLASS was not only used to assess quality, but also as a basis for professional development activities. Teachers received individual feedback after observation, in an attempt to boost classroom quality while the research was ongoing. Findings indicate that classroom quality differs over activities: Teachers generally obtained higher scores during circle time and academic activities, than during snack time and ëindependent workí. This was especially true for the instructional support domain of classroom quality. Moreover, preliminary analyses point out that extent to which the professional development was effective varied over activities: Teachers were more likely to implement their feedback in circle time and academic activities, whereas this was much less the case for ëindependent workí and snack time, even though feedback was provided for these activities as well. The findings of the study add to a discussion about how to report on ëclassroom qualityí as a general measure. In addition, as the professional development activities did impact quality during all activities, the findings contribute to the ongoing discussion about the intensity that is needed in professional development in order actually improve classroom quality. These implications will be thoroughly discussed.

Quality and (in)consistency of classroom interactions and child outcomes in kindergarten

Quantitative methods,School effectiveness,At-risk students,Interdisciplinary,Early childhood education,Learning in context

Mayra Mascareno, University of Groningen, Netherlands; Roel J. Bosker, Rijksuniversiteit Groningen, Dept of Education and GION, Netherlands; Catherine Snow, Harvard Graduate School of Education, United States;

We explore the relationships between the classroom quality children have been exposed to throughout pre-kindergarten and kindergarten (as measured by CLASS in three time-points with four cycles each) and child outcomes. Participants were 1333 prekindergarten children in 96 Chilean classrooms. Outcome variables were end-of-kindergarten scores on language/literacy tests (Woodcock-Munoz Language Survey), attention and socioemotional outcomes (teacher-ratings and Challenging Situations Task). Main and differential effects of CLASS mean quality and quality (in)consistency were identified in a series of multilevel regression models. Main effects of average quality were particularly relevant for instructional support in predicting language/literacy outcomes. (In)consistency scores had a unique contribution to predicting some

of the outcomes, and interacted with the average quality in predicting emergent reading. The addition of (in)consistency measures has both theoretical and empirical value which should be further explored. Overall, children with initial high skills were able to profit more from learning environments than children with low initial skills. More efforts should be devoted to the improvement of classroom interaction with a particular emphasis on turning differential effects in favor of children at a higher risk for learning and developmental delays.

C 27

25 August 2015 15:45 - 17:15

Room Brown_B3

Symposium

Collaborative and cooperative learning

Scaffolding Reasoning and Argumentation

Keywords: Arts ,Cultural psychology,Intelligence,Philosophy,Reflective society

Sig's: SIG 26 - Argumentation, Dialogue and Reasoning

Chairperson: Freydis Vogel, Technische Universitat Munchen, TUM School of Education, Germany

Organiser: Frank Fischer, Ludwig-Maximilians-Universitat (LMU), Germany

Organiser: Armin Weinberger, Saarland University, Germany

Discussant: Michael Nussbaum, University of Nevada, Las Vegas, United States

To become skillful in reasoning and argumentation learners must acquire complex skills on how to formulate sound arguments and how to engage in a social-discursive dialogue. While argumentation trainings usually focus on formal and abstract rules of argumentation, a different approach is scaffolding reasoning and argumentation in the respective disciplinary context. Obviously, there is a tension in blending scaffolding and argumentation because scaffolding implies some level of external control, while learning to argue ultimately aims to develop autonomy and standpoints. This symposium brings together approaches on scaffolding argumentation across the domains of language learning, history, mathematics, and text comprehension with varying degrees of external control and learners' autonomy. The symposium aims to advance our understanding of the role of different forms of guidance in fostering self-directed argumentation. In the study by Judele et al. learners' discussions in a social network service were structured by an argumentation script with a high degree of external control. Voet and De Wever present the development of a framework to support argumentation by prompting (external control) or distributing roles (autonomy). Vogel et al. used argumentation scripts and

adaptable argumentation scripts that also require learners' autonomy. Anderson et al. studied peer-led discussion groups in which teachers adapted their scaffolding strategies leaving much autonomy to the learners. Beyond reflecting on the complex relation between guidance and autonomous argumentation in collaborative learning, we will discuss how teachers and educational designers can consider the balance of external control and autonomy when developing scaffolding strategies for argumentation in their classrooms.

Using good practice as a basis: Development and adaptation of a framework for historical reasoning

Teaching/instruction,Argumentation,Reasoning,Social aspects of learning,Cooperative/collaborative learning

Michiel Voet, Ghent University, Belgium; Bram De Wever, Ghent University, Belgium;

Taking a domain-specific perspective, the present contribution details how a framework was developed for reasoning and argumentation in history, and then adapted into instructional supports. Based on think aloud protocols presenting the reasoning of 20 history teachers during an inquiry task about the past, three main processes of historical reasoning were identified: retrieving evaluation, evaluating information, and making a claim. Using a collaboration script approach, these findings were used to design scaffolds for reasoning. However, despite a clear theoretical framework being available, the work was not clear-cut, as the same framework could be adapted into different types of support. Within the context of this research project, a distinction could be made between a ëpromptsí and ërolesí approach, varying in the extent to which they left room for student autonomy. In short, the case presented here clarifies how designing scaffolds does not only require careful consideration of content, but also of form.

Language learning through argumentation: the influence of scripts and awareness apps in Facebook

Educational technology,Second language acquisition,Argumentation,Reading comprehension,E-learning/ Online learning,Computer-supported collaborative learning

Raluca Judele, Saarland University, Germany; Dimitra Tsovaltzi, Saarland University, Germany; Armin Weinberger, Saarland University, Germany;

Language learning is about becoming experienced at using vocabulary and grammar to express oneís self and understand others. Argumentative scripts can assist learners to read text in a foreign language in a structured way and acquire both language and argumentation practices. SNS as an arena for argumentation and discussion might be a good host of such support. However, as this environment is unstructured and contains possibly a lot of irrelevant information, the awareness of relevant information must be facilitated. We present a 2?2-study (N = 36) on the interaction effects on processes and outcomes in reading comprehension of a Facebook app that scripts language learners to critically deliberate on their answers and raises their awareness of peer opinions. Additionally, we measure personality traits of the learners with the NEO-FFI to control influences of personality. Our results indicate significant learning gains

and a significant interaction effect for vocabulary for all learners when using the app, but no significant main effect of script or awareness tool for knowledge outcome. Moreover, the personality trait of conscientiousness shows as a negative predictor of learning outcomes, mostly for the control group. These results suggest that being highly conscientious may be problematic in SNS, but also that these effects may be counterbalanced by scripts or awareness.

Scaffolding argumentation with adaptable argumentation scripts: The role of self-regulation skills

Experimental studies,Instructional design,Argumentation,Self-regulation,Mathematics,Computer-supported collaborative learning

Freydis Vogel, Technische Universitat Munchen, TUM School of Education, Germany; Ingo Kollar, University of Augsburg, Germany; Elisabeth Reichersdorfer, TU Munchen, Germany; Stefan Ufer, Ludwig-Maximilians-Universitat (LMU), Germany; Kristina Reiss, Technische Universitat Munchen (TUM), Germany; Frank Fischer, Ludwig-Maximilians-Universitat (LMU), Germany;

Although argumentation skills are required when collaboratively solving mathematical proof tasks, students often have problems with argumentation in this context. Argumentation scripts that structure studentsí argumentation during learning seem to be a promising way to support their acquisition of argumentation skills. Yet, argumentation scripts may overscript studentsí argumentation, leading to a suboptimal acquisition of argumentation skills. To prevent this, a possible solution might be to offer adaptable argumentation scripts that give students the opportunity to adjust the script to their own needs. Yet, this might only be beneficial for learners with sufficiently developed self-regulation skills. We present a study that compared the effectiveness of three different argumentation scripts (high structured vs. low structured vs. adaptable) on studentsí argumentation skills. Furthermore, we investigated to what extent self-regulation skills as individual learning pre-requisites influence the acquisition of argumentation skills in the three different conditions. N = 111 math students were randomized to the three treatment conditions and worked collaboratively in dyads on mathematical proof tasks. Results show that studentsí argumentation skills increased between pre- and post-test ($F(1,106) = 12.83$, $p < .01$, ?≤ = .11) with comparable gains in all three conditions. Only for students learning with the adaptable argumentation script, self-regulation skills were a significant positive predictor for argumentation skills ($b = 0.91$, $p < .01$, R≤ = .24). The possibility to adapt argumentation scripts to oneís own needs does not hinder learning. But, to benefit from this rather autonomous scaffolding, students need to possess a certain degree of self-regulation skills.

Teacher scaffolding of reasoning and argumentation

Synergies between learning, teaching and research,Teaching/instruction,Argumentation,Reasoning,Cooperative/collaborative learning

Richard Anderson, University of Illinois, United States; May Jadallah, University of Illinois, United States; Tzu-Jung Lin, The Ohio State University, United States;

Sequential analysis of a corpus of teacher-student talk during 176 child-managed collaborative discussions of moral and practical dilemmas by fourth graders in the Midwest of the United States revealed significant effects of teacher scaffolding moves on childrenís relational thinking during the next few turns for speaking. Most influential were teacher prompts for higher-order thinking. Contingent teacher praise and behavioral management also had significant positive effects. The underlying mechanism of teacher influence appears to be that of catalyst. Once a teacher stimulates one student to generate relational thinking, other students spontaneously generate relational thinking collaboratively at an accelerating rate without further teacher support.

C 28

25 August 2015 15:45 - 17:15

Room Green_A8

Symposium

Mathematics education

Can the number line task still be considered as a measure of internal numerical representations?

Keywords: Cognitive development,Experimental studies,Mathematics,Numeracy

Sig's: SIG 5 - Learning and Development in Early Childhood

Chairperson: Koen Luwel, KU Leuven, Belgium

Organiser: Koen Luwel, KU Leuven, Belgium

Organiser: Lieven Verschaffel, KU Leuven, Belgium

Discussant: Drew H. Bailey, University of California, United States

The number line estimation (NLE) task involves estimating the position of numbers on an empty number line with labeled endpoints. This task is claimed to be a pure measure of individuals' mental representations of number. However, some researchers recently challenged this claim by proposing that this task may rather assess more general skills such as proportional reasoning and/or the ability to (flexibly) apply certain estimation strategies. The present symposium contributes to this ongoing debate by providing and discussing several pieces of evidence for this alternative explanation.Simms et al. demonstrate that NLE performance is associated with visual-spatial skills which play a pivotal role in proportional reasoning. Based on trial-by-trial verbal reports, Peeters et al. provide direct evidence that young adults apply a variety of (benchmark-based) strategies when solving the NLE task. Mitchell et al. discuss the extent to which gender differences in NLE performance can be explained by differences in NLE

strategies. Finally, Dackermann et al. show that the position of the target number but not the extent to which instructions referred to the midpoint affects the use of midpoint-based strategies in children's NLE. Theoretically, this set of studies raises strong doubts whether the NLE task can still be used as a pure measure of mental number representations. Educationally, it should be investigated to what extent the training of visual-spatial skills and/or strategies that are involved in this task that might lead to an improvement in children's math proficiency. Bailey will provide a critical discussion of these findings and implications.

Number line estimation performance and mathematical achievement: The impact of visual-spatial skills

Experimental studies,Cognitive skills,Numeracy,Mathematics,Primary education

Victoria Simms, Ulster University, United Kingdom; Sarah Clayton, Loughborough University, United Kingdom; Lucy Cragg, University of Nottingham, United Kingdom; Camilla Gilmore, Loughborough University, United Kingdom; Neil Marlow, University College London, United Kingdom; Samantha Johnson, University of Leicester, United Kingdom;

Recent debate has questioned whether the number line estimation task provides a pure measure of childrenís internal representations of number. Specifically, there has been a suggestion that this task may be a measure of proportional judgement skills; if this is the case we would expect visual-spatial skills to influence performance on the number line task. The current study investigated the relationships among visual-spatial skills, number line estimation and mathematical achievement. Seventy-seven children were assessed using a number line estimation task and standardised measures of mathematical achievement and visual-spatial skills. It was observed that all measures were significantly correlated. Additionally, the relationship between one metric from the number line estimation task (R≤LIN) and mathematical achievement was explained by visual-spatial skill competency. The findings are discussed in relation to their implications for the use of metrics of the number line estimation task in research.

The number line estimation task: Evidence for the use of benchmark-based strategies in adults

Experimental studies,Cognitive skills,Numeracy,Mathematics

Dominique Peeters, KU Leuven, Belgium; Lieven Verschaffel, KU Leuven, Belgium; Koen Luwel, KU Leuven, Belgium;

Participantsí estimation pattern on a number line estimation task is usually interpreted as the reflection of their underlying mental number line. However, recent findings (Ashcraft & Moore, 2012; Barth & Paladino, 2011) challenge this widespread assumption by suggesting that strategies might play an important role when solving this task. The present study tested this assumption directly by gathering trial-by-trial verbal strategy reports when solving a number line estimation task. Sixty-three adults made number line estimations on a 0 to 1000 number line. Participants were assigned to one of three conditions in which the number of benchmarks on the number line was varied to elicit potential benchmark-based estimation strategies: (a) only the

origin and endpoint were indicated (bounded condition); (b) an extra benchmark at the midpoint (500) was presented (midpoint condition); (c) three additional benchmarks (250, 500, and 750) were specified (quartile condition). Results indicated that participants in the midpoint and quartile condition estimated more accurately than in the bounded condition. Furthermore, the verbal strategy reports revealed that, as the number of provided benchmarks increased, participants relied more frequently on the halving strategy, in which they split the number line into halves, quarters and sometimes even eights. Importantly, we observed that in all three conditions, participants not only made use of the externally presented benchmarks, but also used them to create more refined internal benchmarks when making number line estimations. These findings have both theoretical and educational implications.

Sex as a source of variance in number line estimation tasks: Evidence from across the lifespan

Experimental studies,Cognitive development,Cognitive skills,Numeracy,Mathematics,Primary education

Thomas Mitchell, Edge Hill University, United Kingdom; Rebecca Bull, National Institute of Education, Singapore; Alexandra Cleland, University of Aberdeen, United Kingdom;

Number lines are used as a supportive tool for developing numerical computation competencies in classroom environments. Research has shown that acuity in number line estimation (NLE) is a significant predictor of later mathematics achievement. Differences in the use of spatial strategies, such as using self-created anchor points, have been found to increase with age. Although sex differences have been found for performance on number line tasks, a thorough investigation of the possible sources of this variability is still lacking. The present series of studies aimed to assess whether sex differences in NLE were present throughout development and whether this could be explained by differences in the use of NLE strategies. This was achieved by re-analysing published data, and two new experimental studies from child (age M=8.06 yrs.), young adult (age M=22.01 yrs.) and older adult (age M=65.3 yrs.) populations. Although males made significantly less error than females across the samples, a contour analysis found no effects of age or sex in anchor-point based strategy use, with all groups using the midpoint effectively. However, females showed a reduced ability to integrate spatial and numerical information compared to males. These findings suggest that femalesí weaker NLE performance, is not due to differences in strategy use but rather to a reduced ability in accessing magnitude and spatial information. Findings are discussed with relation to implications for the use of number lines as a teaching tool in the mathematics classroom.

Influences of presentation format and task instruction on childrenís number line estimation

Experimental studies,Cognitive development,Numeracy,Mathematics,Primary education

Tanja Dackermann, Knowledge Media Research Center, Germany; Stefan Huber, Knowledge Media Research Center, Germany; Korbinian Moeller, Knowledge Media Research Center, Germany; Hans-Christoph Nuerk, Psychology, Germany;

A standard task to assess the spatial representation of number magnitude (aka the mental number line) is the number line estimation task in which the spatial positions of target numbers have to be located along an empty number line of which only the endpoints are specified (e.g., 0 and 100). However, there is a current debate whether age-related differences in task performance directly reflect the development of the underlying magnitude representation or rather reflect childrenís proficiency in applying estimation strategies such as proportion judgment. Yet, it is important to note that the studies arguing with different interpretations about estimation performance did use slightly different task versions. Therefore, the current study aimed at pursuing the question of how target placement and instruction about the midpoint of the number line influence childrenís number line estimation performance. Evaluating the estimation performance of 47 second-graders revealed that both, presentation of the target number above the midpoint of the number line as well as the instruction of the midpoint led to a more prominent use of proportion-judgment strategies. Furthermore, target numbers above the midpoint also increased childrenís performance accuracy. Taken together, the current findings provide further evidence that performance in the number line estimation task does not allow for direct inferences about the underlying spatial representation of number magnitude. Both the placement of the target number as well as the explicit instruction about the midpoint induce the application of specific estimation strategies and thus influence childrenís task performance.

C 29

25 August 2015 15:45 - 17:15

Room Blue2_D1

Symposium

Cognitive development

Math development: The role of cognitive and symbolic number processing abilities, and motivation

Keywords: Achievement,Cognitive development,Mathematics,Motivation and emotion,Quantitative methods

Sig's: SIG 5 - Learning and Development in Early Childhood

Chairperson: Riikka Mononen, University of Helsinki, Finland

Organiser: Johan Korhonen, Abo Akademi University, Finland

Discussant: Pirjo Aunio, University of Helsinki, Finland

The aim of the symposium is to advance the knowledge base on factors influencing mathematical development in childhood. The individual studies contribute to their respective fields of interest by applying a longitudinal design, introducing important predictors for mathematical

development and testing their effects. Tr?ff and ?stergren showed that symbolic number abilities as well as cognitive abilities were uniquely foundational to early arithmetic proficiency and that the strength of these relations varied as a function of time. Lee demonstrated that inhibition played a stronger role in the pattern than the standardised mathematics task. Nonetheless, the amount of variance explained by inhibition was consistently lower than that explained by updating. Zang and colleagues found that rapid automatized naming (RAN) uniquely predicted mathematical development even when controlling for demographic, linguistic, spatial, and numerical variables. The study of Niemivirta et al showed that students' competence beliefs were predicted by prior math performance, whereas, no similar link was found between performance and interest. The results corroborate previous findings concerning the role of symbolic number abilities and general cognitive abilities (Fuchs et al., 2010), inhibition and updating (Bull & Lee, 2014), and interest and competence beliefs (Eccles & Wigfield, 2002) on mathematical development. Additionally, the results further our understanding of the link between RAN and mathematical development. The findings provided by this symposium can help educators to identify key elements in supporting children?s mathematical skill acquisition.

Number processing and general cognitive abilities as precursors of early mathematical proficiency

Quantitative methods,Cognitive development,Cognitive skills,Mathematics

Ulf Traff, Linkoping University, Sweden; Rickard Ostergren, Linkoping University, Sweden;

The aim was to examine if symbolic number processing abilities and general cognitive abilities are uniquely foundational to early mathematical ability and itsí development. This was accomplished by using three-year longitudinal data, analysed with structural equation modelling. A sample of 315 preschool children (Mage = 6.62 years, SD = 0.34) participated and was tested across 3 consecutive years, Symbolic number knowledge (SNK), symbolic number magnitude processing (SNM), and general cognitive abilities (GENCOG) were assessed in preschool. Arithmetic skills were assessed in first and second grade. Three structural equation models were computed. They demonstrated that SNK and GENCOG are uniquely foundational to future arithmetic proficiency in grade 1 and 2, while SNM is not. Model 1 and 2 also demonstrated that the relative influence of the SNK and GENCON change as a function of time. Consistent with Ackermanís general theory of skill acquisition (1988), GENCON were less important during second grade (i.e., later phase) compared to first grade (i.e., early phase), whereas the reverse was true for SNK. Model 3 showed that SNM is uniquely foundational to growth in arithmetic proficiency, whereas SNM and GENCOG are not. The overall results are consistent with previous findings and corroborate von Aster and Shalevís developmental model of numerical cognition (2007), by showing that symbolic number abilities as well as cognitive abilities are uniquely foundational to early arithmetic proficiency. Additionally, the development of early arithmetic proficiency relies to some extent upon efficient symbolic number magnitude processing.

Inhibitory abilities and mathematics: performances on a pattern and standardized mathematics task

Quantitative methods,Cognitive development,Cognitive skills,Developmental processes,Mathematics

Kerry Lee, National Institute of Education, Singapore;

Because paying attention to the task at hand is a prerequisite for task completion, ability to inhibit task irrelevant thoughts should be related closely to performance. Yet, in a recent review, Bull and Lee (2014) found no clear evidence for the involvement of inhibition in mathematical achievement. Most previous studies used performances on standardised mathematics achievement as criterion measures. Because they may lack sensitivity to the role of inhibitory abilities, we conducted a study that examined performances on both standardised mathematics tasks and two mathematics patterns tasks that were expected to have greater inhibitory demands. Using a cohort-sequential design, 656 children (5, 7, 9, and 11 year olds) were administered annually, over four years, tests of executive functioning (updating and working memory, inhibition and switching) and the three mathematics tasks. Preliminary findings suggest that inhibition and switching played a stronger role in the pattern than in the standardised mathematics tasks. The amount of variance explained by inhibition and switching was relatively modest and tended to be lower than that explained by updating and working memory. Furthermore, the magnitude of these relations varied with grade. These findings have implications for the design of cognitive intervention and for understanding factors that contribute to childrenís difficulties with mathematics.

Does Rapid Automatized Naming (RAN) explain common or unique variance in reading and mathematics?

Quantitative methods,Cognitive development,Cognitive skills,Developmental processes,Mathematics

Xiao Zhang, The Hong Kong Institute of Education, Hong Kong; Tuire Koponen, Niilo Maki Institute, Finland; Pekka Rasanen, Niilo Maki Institute, Finland; Kaisa Aunola, University of jyvaskyla, Finland; Marja-Kristiina Lerkkanen, University of Jyvaskyla, Finland; Jari-Erik Nurmi, University of Jyvaskyla, Finland;

This study aims to examine longitudinal relations between rapid automatized naming (RAN) and reading and mathematical competence during childrenís early school years. Measures of RAN with pictured objects as stimuli, of mathematics with procedural computation tasks, and of reading with reading fluency tasks were administered longitudinally between kindergarten and fourth grade in a sample of 378 children. Growth-curve analyses showed that RAN, measured in kindergarten, significantly predicted common variance in reading and mathematical development through fourth grade. Moreover, RAN also significantly predicted unique variance in mathematical development but not that in reading development. There was no evidence of the prediction of mathematical or reading competence to the growth of RAN skills. These results highlight the potential role of RAN in engendering individual differences in childrenís developmental trajectories of reading and mathematics.

The role of gender and motivation in elementary school studentsí mathematical development

Quantitative methods,Cognitive skills,Mathematics,Motivation and emotion

Markku Niemivirta, University of Helsinki, Finland; Pirjo Aunio, University of Helsinki, Finland; Katariina Nuutila, University of Helsinki, Finland; Mari-Pauliina Vainikainen, University of Helsinki, Finland;

This study investigates elementary school studensí mathematical development from grade one to grade six as well as the role of gender and motivation (i.e., domain-specific interest and competences perceptions) play in that. The data (N = 944) come from an on-going longitudinal study, in which studentsí skills and motivation in different domains have been assessed. In grades four and six, we used three tasks assessing arithmetic skills, world problem-solving skills, and arithmetical reasoning. In connection to each task, the students were also asked to rate their level of interest and expectancy of success in the tasks. In the first grade, two tasks were used to measure visuo-spatial working memory and analogical reasoning. In terms of cross-lagged predictions, studentsí expectancy of success at 6th grade was predicted by 4th-grade task performance and to a lesser extent by task interest. Fourth-grade expectancy of success was, in turn, predicted by 1st-grade cognitive measures. They also predicted 4th-grade task performance, but not interest. As to gender differences, although no differences were found in our cognitive measures, effects favoring boys were found on both 4th- and 6th-grade expectancies of success. The results echo previous findings suggesting a link between math performance and competence perceptions but not between performance and interest. The long-term prediction from performance to expectancies, but not vice versa, is in line with the skill development model of competence. The patterning of gender differences raises the question of stereotypical threat that might undermine girlsí competence perceptions.

D 1

26 August 2015 08:45 - 10:15

Room Green_A4

Invited SIG

Learning approaches

The objects of educational research in different traditions of theorizing

Keywords: Culture, Interdisciplinary,Learning approaches,Reflection,Social interaction

Sig's: SIG 25 - Educational Theory

Chairperson: Rupert Wegerif, University of Exeter, United Kingdom

Organiser: Giuseppe Ritella, University of Helsinki, Italy

Discussant: Gert Biesta, Brunel University London, United Kingdom

SIG 25 is currently engaging in a debate about the roles of theory in different traditions of theorizing and research on learning and instruction. In particular, we consider the framing of the object of educational research a foundational theme for our SIG. Indeed, framing the object of educational research is a process where theory plays a major role, with important implications for the aims and scope of our research programs. This symposium aims at creating a forum for the constructive dialogue between scholars that hold different perspectives on the object of educational research. The questions that inspire the symposium are: How do we conceptualize the objects that guide our research interests and define the aims of our investigations? What kind of theories do we bring into play for that and what implications do the framing of our research objects have for our research and for the educational practices that we investigate? Some controversies emerged in this respect. For example, while some researchers investigate educational arrangements that may support the development of the individual subjectivity of students, others point to the socio-cultural development of communities, variously framed. Some focus on mechanisms of learning while others argue that learning is not a possible object of ëeducational' research since learning assumes a normative framework that ought instead to be the object of research. Moreover, as social demands and conditions of schooling are rapidly evolving, there is the question of which ways of conceptualizing the object of educational research are suited to investigate the new challenges of learning and instruction.

Expanding the object from school to life: Educational research approaching crossroads

Case studies,Learning approaches,Informal learning,Out-of-school learning,Learning in context

Yrjo Engestrom, University of Helsinki, Finland;

Public schooling is rapidly entering the most severe crisis of its history, manifested in the massive wave of privatization and marketization in the US. This development will eventually leave educational research with three alternatives: (1) to go along and become a servant of marketization; (2) to become a partisan defendant of public schooling, gradually losing ground; (3) to build an expanded vision of education which embraces progressive social movements and emancipatory forms of communal life as foundational units of education. I will argue for the third alternative. To build such an expanded vision of education and educational research, we need criteria for emancipatory forms of communal life and progressive social movements. I will examine three examples, namely (a) the Farmer-to-farmer movement in Central America, (b) the food circles in Finland and France, and (c) the New York City Community Land Initiative. The analysis of the three cases leads me to propose a set of key concepts and criteria for expanded objects of educational research. The analysis also reveals a number of novel potentials for education, as well as methodological challenges for educational research.

Time-space and the scientific chronotopia of a single case

Case studies,Developmental processes,Learning approaches,Science education

Sanne Akkerman, Utrecht University, Netherlands; Tania Zittoun, Institute of psychology and education, Switzerland; Jaan Valsiner, Aalborg University, Denmark;

Recurrently facing inconsistent and contradictory empirical findings across all domains of educational research, the field shows renewed efforts in searching for theory and method more advanced in grasping the natural complexities of learning and development and education. This article pertains that current advancements reflect fundamental shifts in our ëscientific chronotopiaí, that is, reflect changes in the way we employ time-space configurations in the conduct of analysis. Learning and development can be considered the central phenomena studied in educational research, yet difficult to grasp. By definition they concern processes of change that are ongoing and that can be rendered scientifically accessible only when localized in and marked by time-space. The aim of this article is to sketch three different configurations of time-space underlying the current advancements in scientific analyses, typified subsequently as patterned, multi-patterned and sensed configurations of time-space. We will pertain that each configuration allows making different claims with regards to learning and development, respectively as processes over, across, and through time-space, yet also lead us to different forms of causality. To show how the adoption of one or another time-space configuration maps onto the real-world phenomena, we will relate our discussion to an educational case study of a student, from a research project on science interest development (Akkerman & Bakker, 2012-2014), who follows a special educational talent program during the last two years of her late secondary education and makes the transition to postsecondary education in an unexpected direction.

Taking dialogue as an object of educational research

Culture,Developmental processes,Learning approaches,Reflection,Social interaction,Philosophy

Rupert Wegerif, University of Exeter, United Kingdom;

One purpose of this symposium is to foreground how the way in which we conceptualise the object of educational research impacts on the conduct of that research. In this talk I will take the example of educational dialogue to explore this issue further. Educational dialogue, whether face-to-face dialogues in classrooms or online dialogues via video and text chat, is increasingly taken as the object of research. How people conduct research into dialogue implies different ways of understanding dialogue. Through bringing out the strengths and weaknesses of these different methodological choices I will also comment on our lack of understanding of the nature of dialogue. This leads to the second part of the talk where I will put forward a new conceptualisation of dialogue combining the concept of chiasm as developed by Merleau-Ponty and the concepts of pre-individual and trans-individual developed by Simondon. I will argue that this new conceptualization suggests a new practical programme of research that might be more effective than previous research on dialogues. Through taking the example of dialogue I will also make a larger argument about the important role of theory in educational research, improving the quality of research through developing our understanding of the object(s) of research.

Space-time relations as an object of investigation: ?he concept of chronotope

Educational technology,Interdisciplinary,Computer-supported collaborative learning,Distributed cognition,Learning in context

Giuseppe Ritella, University of Helsinki, Italy;

This paper aims at discussing how space-time relations can be conceptualized as an object of investigation relevant for the analysis of contemporary educational practices. In particular, the focus is on how the use of the concept of chronotope is contributing to setting the agenda of this field of research. Firstly, I will briefly discuss (1) some considerations regarding ongoing societal transformations that are making research on space-time relevant for contemporary educational theory and practice; and (2) how the concept of chronotope has been used in previous investigations to frame the ongoing debate about space and time in educational research. Secondly, I will use my own conceptualization of chronotope to discuss how theoretical assumptions, empirical work and methodological considerations contributed to the building of the object of investigation in my research. Thirdly, I will discuss how my research may contribute to broader discussions in educational theory and practice. This will involve the discussion of problems and challenges that may emerge when entering in a dialogue with scholars coming from different traditions of theorizing.

D 2

26 August 2015 08:45 - 10:15

Room Brown_B2

Invited SIG

Teacher professional development

Interplay of teachersí professional competencies, teaching actions and student learning

Keywords: Competencies,Mixed-method research,Teacher professional development,Teaching/instruction,Video analysis

Sig's: SIG 11 - Teaching and Teacher Education

Chairperson: Tina Seidel, Technische Universitat Munchen (TUM), Germany

Organiser: Tina Seidel, Technische Universitat Munchen (TUM), Germany

Organiser: Kari Smith, Norwegian University of Science and Technology (NTNU), Norway

Discussant: Theo Wubbels, Utrecht University, Netherlands

It is widely acknowledged and empirically shown that teachers with their professional competencies make a significant difference in student outcomes (Hanushek & Rivkin, 2010; Hattie, 2008). Therefore, teaching and learning research is focused on reaching advancement in conceptualizing and measuring differences in teachers' professional knowledge, as well as investigating its effect on instructional quality and student outcomes (Hill et al., 2008; Baumert et al., 2010). In addition, more and more mixed-method approaches are applied, taking into account student diversity and its impact on the interplay of teacher-student-interactions in classrooms (Jurik et al., 2013). Next to explaining the complex interplay of teacher competencies, student diversity and teaching-learning actions in classrooms, possibilities for improvement in form of teacher professional development are studied (Borko, 2012). In this sense the cycle between teacher competencies, its effect on classroom interactions and improvement through professional development is closed. In this invited symposium of SIG 11 "Teaching and Teacher Education", we want to give insight into these new developments and give examples for front-line teaching and learning research. All studies use mixed-method approaches, incorporate quantitative measurement of teacher or student competencies and qualitative analyses of teaching actions by means of video analysis. The symposium will show how teacher professional competencies play out in the quality of teaching actions, but also that students' prerequisites are important factors to consider when studying the flexible application of teacher competencies in action.

Interplay of teacher knowledge, quality of instruction, and student achievement in fraction lessons

Mixed-method research,Teaching/instruction,Achievement,Mathematics,Secondary education

Marieke Thurlings, Eindhoven University of Technology, Netherlands; Perry den Brok, Eindhoven University of Technology, Netherlands; Maaike Koopman, Eindhoven University of Technology, Netherlands;

This proposal describes a study that focuses on the interplay of mathematics teacher knowledge, instructional quality, and student achievement for the domain of fractions. In primary education, learning to calculate with and use fractions is one of the hardest parts of mathematics. This study uses the theoretical framework of mathematical teachers knowledge (MKT) and an observational instrument for mapping the quality of mathematical instruction (MQI; Hill, Ball, & Schilling, 2008; Hill, Blunk, et al., 2008). In our study, we followed 25 Dutch fifth grade teachers (the penultimate grade in primary schools, where children are about 11 years old) throughout one school year. Student proficiency in the domain of fractions was measured at the beginning and end of the year; three fraction lessons were observed using the MQI spread over the year; and teachers completed a fraction knowledge test based on the MKT that mapped subject content knowledge and pedagogical content knowledge. By means of cluster analysis, we revealed six clusters based on instructional behavior (MQI). The clusters differed between the strengths and weaknesses of general pedagogical and pedagogical content teaching strategies. We observed a statistically significant correlation between pedagogical content knowledge and the behavior clusters: the better the pedagogical content knowledge (MKT), the better the pedagogical and pedagogical content teaching skills (MQI). No statistically significant correlation was found

between the clusters and student growth scores. Implications for teaching fractions will be discussed.

Interplay of student prerequisites and participation in mathematics and language arts classrooms

Mixed-method research,Teaching/instruction,Social interaction,Language (L1/Standard Language),Mathematics

Janina Hausler, Technische Universitat Munchen (TUM), Germany; Verena Jurik, Technische Universitat Munchen, Germany; Sina Stubben, Technische Universitat Munchen, Germany; Tina Seidel, Technische Universitat Munchen (TUM), Germany;

An active participation in classroom interactions is essential for the learning development of students (Mercer, 1996; Webb, 2009). Previous studies have shown that student participation is dependent on studentsí individual prerequisites, but also teachersí expectations (Hofer, 1997; Seidel & Reiss, 2014). However, prior studies have not yet brought these perspectives together. Our study investigates the interaction of NS = 493 students of NC = 20 German eighth grade classrooms with NT = 41 teachers within the school year 2013/14 by considering questionnaire data of students and teachers on individual student learning prerequisites like general cognitive ability, prior achievement, interest, and self-concept, as well as a video-taped mathematics and language arts lesson of each class. Videos were coded to identify studentsí intention for participation through hand-raising. First findings show that studentsí gender as well as interest and self-concept play an important role for classroom participation. Teachersí judgments of student prerequisites ñ mainly concerning interest and self-concept ñ also are partially related to student participation. Moreover, there are significant interactions between gender, student prerequisites and teacher judgments. Our findings shed light on the complex interplay of what students and teachers bring to the classroom and what, then, happens in the classroom ñ making them relevant for both, research and practice.

Gendered classroom interactions, student sense of equality and student achievement

Mixed-method research,Teaching/instruction,Social aspects of learning,Mathematics,Reading comprehension,Secondary education

Els Consuegra, Vrije Universiteit Brussel (VUB), Belgium; Myriam Halimi, Vrije Universiteit Brussel, Belgium; Nadine Engels, Vrije Universiteit Brussel, Belgium;

Teacher-student interactions have received increasing attention as a predictor of student educational outcomes. With regard to the underachievement of boys, observational studies have shown that boys receive more negative attention from their teachers than girls. In this mixed method study the relationship between teacher-student classroom interactions, students' perception of equality in the classroom, initial ability and grade retention were analyzed. Questionnaires and standardized ability tests for math and reading were administered to 6380 first year secondary students. For a sub-sample of 180 students, fifteen-minute fragments of video-recorded lessons were coded. At the end of the year information was gathered about

studentsí certification (grade retention). Quantitative analyses confirm that boys receive more negative feedback. The hypothesis that this is the consequence of boys merely being more disruptive than girls is not supported. For boys, a significant correlation was found between negative feedback and off-task behavior and unauthorized interaction with other students. This was not found for girls and this inequality might explain boysí significantly lower sense of equity in the classroom (even when controlled for SES, etnicity, language background, math and reading ability). Students reporting lower sense of equity are in turn significantly overrepresented in the population of students that has to repeat a year. Grade retention is nearly twice as high in boys than in girls. This study supports the hypothesis that teacher gender bias is influencing teacher-student classroom interactions and student achievement. Video-stimulated reflection is suggested as a means to increase teacher awareness of their (unconscious) gender bias.

Impact of practice-based professional development on elementary teachersí science instruction

Mixed-method research,Teacher professional development,Teaching/instruction,Primary education

Hilda Borko, Stanford University, United States; Jonathan Osborne, Stanford University, United States; KC Busch, Stanford University, United States; Anita Tseng, Stanford University, United States; Susan Million, Stanford University, United States; Florencia Gomez Zaccarelli, University of Michigan, United States; Eric Berson, Stanford University, United States;

This presentation will examine the impact of the Practicum Academy for Improving Science Education (PRACTISE) science professional development model on the instructional practices of elementary (grades 3-5) classroom teachers. The PRACTISE model consisted of three components: a week-long summer Institute focused on facilitating scientific discourse; a two-week Practicum during which participants teach science in a summer school program; and follow-up sessions during the academic year that provide guidance and support as they incorporate the new instructional practices into their teaching. To test the efficacy of the model, our research team is comparing the instructional practices of teachers who experienced the full model (Institute, Practicum & Follow-up Days), and teachers who experienced the model minus the Practicum. The presentation will describe the instructional practices to support scientific discourse among students that were emphasized in the PD, and compare the teachersí science discussions before and after participating in one year of the PD program. We analyzed video-recordings of the science lessons using an observation protocol focused on classroom discussions that our research team developed. There was positive change in both groups across all observation rubrics. For example, teachers asked open-ended questions more consistently and more often pressed students to provide reasoning for their claims, and students more consistently provided extended explanations and reasoning for their claims. Also, compared to teachers who did not participate in the practicum, the teachers who participated in the full academy pressed their students more consistently and their students more commonly built on their peersí comments.

26 August 2015 08:45 - 10:15

Room Brown_B3

Invited SIG

Educational policy

Inequality in educational systems as a result of social interaction within a multilevel context

Keywords: Educational policy,School effectiveness

Sig's: SIG 23 - Educational Evaluation, Accountability and School Improvement

Chairperson: Katharina Maag Merki, University of Zurich, Switzerland

Organiser: Katharina Maag Merki, University of Zurich, Switzerland

Discussant: Daniel Muijs, University of Southampton, United Kingdom

This symposium brings together an array of theoretical and empirical research on the question of how inequality in educational systems changes over the years and how it is influenced by system and/or school factors. The symposium is structured based on the educational governance approach (Altrichter & Maag Merki, 2010) that understands educational systems as a result of the interdependency of structure, action and individual characteristics of multiple actors in a multilevel perspective.The symposium starts with a theoretical paper by Marcus Emmerich and Ulrike Hormel. They argue that from the point of view of social constructivism and social systems theory, education inequality is generated by education systems.In the first empirical paper, comparing Brazil and Germany, Nicole Pfaff argues that individual decisions for education as well as formal structures and practices of selection within educational institutions are related to legitimatory discourses.In the second empirical paper, Chantal Kamm, Franziska B?hlmann, Marcus Emmerich, and Katharina Maag Merki point out the importance of individual orientations of head teachers in primary schools within a comparatively socially disadvantaged context in the highly selective educational system in Switzerland.In the last paper, Kim Bellens, Jan Van Damme, Wim Van Den Noortgate & Sarah Gielen aim at investigating trends in educational quality and equity amongst 17 countries in grade 4.This symposium extends previous research on long-term changes in and the influencing factors on educational inequality by investigating trajectories, processes, discourses and individual orientations of actors in dependence on policy and accountability systems.

(Re-)Producing inequality: Educational systems and the grammar of inklusion/exklusion

Cultural diversity in school,Educational policy,Attitudes and beliefs,Educational attainment

Marcus Emmerich, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland; Ulrike Hormel, University of Education of Ludwigsburg, Germany;

The paper addresses a theoretical desideratum in current research on education inequality and argues that from a social constructivist and social systems theory point of view, education inequality can only be generated by and within education systems. It theorizes a ëgrammar of inclusion/exclusioní based on different forms of organizing school and instruction orienting ëlearning supportí strategies as well as enabling ëselectioní and creating unequal opportunities in education. Different sociological approaches to investigate the phenomena and mechanisms of reproducing education inequality will be compared and discussed. Main references are Niklas Luhmannís theory of social systems (1984), Charles Tillyís considerations on ëdurable inequalitiesí generated by organizations (1999) and Hugh Mehans interpretive approach on reconstructing school-based mechanisms creating education inequality.

ëGiftednessí and ëCommitmentí as Rationalized Mythís in School ñ Researching Legitimatory Discourses

Case studies,Comparative studies,Qualitative methods,Educational policy,Attitudes and beliefs

Nicolle Pfaff, University of Duisburg-Essen, Germany;

This paper aims to explore and analyse legitimatory discourses in educational systems on different levels and in a comparative perspective. In the application of the concept of ërationalized mythí from early world polity approach and itís re-reading from the perspective of sociology of knowledge, empirical results from a comparative qualitative study of student biographies are related to formal structures of school systems in Brazil and Germany and to relevant educational and political programs in both countries. Theoretical perspectives are developed to overcome the isolated analysis of educational practices, discourses and institutional structures. A research program related to the analysis of educational inequality is emphasised, that might offer insides in mechanisms that secure the persistence of educational inequality.

School-based inclusion and exclusion processes in primary schools in Switzerland

Case studies,Comparative studies,Qualitative methods,Educational policy,Attitudes and beliefs,Developmental processes

Chantal Kamm, University of Zurich, Switzerland; Franziska Buehlmann, University of Zurich, Switzerland; Marcus Emmerich, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland; Katharina Maag Merki, University of Zurich, Switzerland;

Due to decentralization and autonomy, schools are increasingly responsible to develop and implement their own context-sensitive strategies to compensate for social inequalities in education. However, previous studies fail to explain how schools as organizations ëuseí the given systems for supporting and selecting socially disadvantaged students. In this study, it will be analyzed which school internal orientations are central for headmasters in seven primary schools in the city of Zurich with a comparable socially disadvantaged context when planning

and implementing adaptive-compensatory support strategies. Based on the educational governance-approach, and the sense-making perspective in organizational theory, we analyzed how they a) interpret the social and institutional context of their schools; b) how they relate these contexts to the differential educational needs of their students; c) how they accordingly plan and develop adaptive-compensatory support strategies. The project is designed as a cross-sectional comparative case study. Problem-centered interviews with the headmasters of the schools and school-specific document analyzes were conducted. The findings revealed that headmasters characterized their schools in different ways (e.g. with regard to the profile of their school, with regard to their socio-demographic context or with regard to demographic changes in their district (e.g. gentrification)). Furthermore, the reduction of funds due to gentrification asked for new strategies in the acquisition of funds, but also for a re-organisation of the school itself (e.g. the introduction of all-day schools). The results will set a basis for understanding how schools can reproduce and compensate for education inequality.

Countriesí strive towards more quality and equity in education? Evidence from TIMSS 2003 and 2011

Case studies,Comparative studies,Qualitative methods,Cultural diversity in school,Educational policy,Attitudes and beliefs

Kim Bellens, University of Leuven, Belgium; Jan Van Damme, KU Leuven, Belgium; Wim Vandennoortgate, University of Leuven, Belgium; Sarah Gielen, University of Leuven, Belgium;

Past decade, countries have been striving towards more quality and equity in their educational system. This study aims at investigating to what extent countries succeeded in both aims, by investigating trends in educational quality and equity amongst 17 countries. To get a full grasp on these trends, we look both at trends in average achievement as well as at trends in achievement level of the 10% best and 10% lowest performing students. Furthermore, we investigate whether there is congruency between trends in quality and trends in equity. Hierarchical multilevel modelling is conducted with data of 17 countries which participated in TIMSS 2003 and 2011, Grade 4. Results indicate an overall increase in math achievement, a stable level of science achievement, an overall decrease in social equity and an overall increase in ethnic equity. However, differences between countries are noticed, with for some countries trends in the other direction. Finally, no systematic relationship is found between trends in quality and trends in equity.

D 4

26 August 2015 08:45 - 10:15

Room Brown_B8

Invited SIG

Motivation

New theories for motivation and learning

Keywords: Emotion and affect,Learning approaches,Motivation and emotion,Student learning

Sig's: SIG 8 - Motivation and Emotion

Chairperson: Marina Lemos, University of Porto, Portugal

Organiser: Thomas Martens, Medical School Hamburg, Germany

Organiser: Hanke Korpershoek, University of Groningen, Netherlands

Discussant: Jenefer Husman, Arizona State University, United States

For this symposium we challenged all SIG-8 members to submit new theories of motivation and learning that should cover the following aspects : A new theory/model or at least a valuable contribution to theory development should be presented. It should be demonstrated how old theories are covered and which significant aspects are added or deleted.Which incidents (unexpected results, inconsistenciesÖ) stimulated the proposed model? How do the new concepts alter the current understanding of motivation and learning? The new theoretical approach should explain a broad range of learning phenomena. Theoretical explanations preferably cover motivational processes and also individual differences regarding these processes.First empirical evidence for the new theoretical approach should be provided.Please envision long term implications of the new theoretical approach for the future research practice. The four contributions in this symposium resulted from a double blind peer review process and will demonstrate how the new theoretical approach will cover the required aspects stated above.

Dimensional comparison theory: The domain-specificity of motivation and learning

Student learning,Emotion and affect,Learning approaches,Motivation and emotion

Jens Moller, University of Kiel, Germany;

Particularly in educational settings, a growing body of research demonstrates that self-perception and motivation may be the result of ìdimensionalî comparison, in which accomplishments in one school subject can serve as a frame of reference for another school subject and impact on self-evaluation, motivation, and learning. Dimensional comparison in its original form entails a single individual comparing his or her ability in a (target) domain with his or her ability in a standard domain (e.g., ìHow good am I in math compared with English?î). As the corresponding research shows, dimensional comparisons reduce self-concept, motivation, and learning in the worse-off domain and increase these outcomes in the better-off domain. Beside path-analytic studies, dimensional comparison theory (DCT, M?ller & Marsh, 2013) is based on empirical findings from introspective, path-analytic, and experimental studies. This paper presents the basic principles of dimensional comparison in ten hypotheses, covering their antecedents and their consequences for self-concept, motivation, and learning, and new developments within DCT, e.g. the motivational basis of dimensional comparisons, and possible extensions to other

between-domain comparisons and other contrast effects (e. g. between personality characteristics).

A model of individual processes and contextual conditions facilitating learning from errors

Student learning,Emotion and affect,Self-regulation,Motivation and emotion

Maria Tulis, University of Augsburg, Germany; Markus Dresel, University of Augsburg, Germany;

Learning naturally involves making errors, but learners react differently in the face of errors. From a contemporary research perspective, reflections on errors and the (self-) explanation of misconceptions are important for learning progress since they help to establish accurate mental models. Hence, errors contain seeds of learning - provided that learners are able to deal with their errors in an adaptive and reflexive manner. We propose a model to explain in particular how emotional, motivational and self-regulative processes - influenced by personal dispositions (e.g., traits, orientations) and situational factors, such as a supportive versus impeding social context - interact after the perception of an error. By integrating different theories of self-regulated learning (Boekaerts, 2006; Carver & Scheier, 1998; Winne & Hadwin, 1998), volition theory (Kuhl, 1985, 2000), appraisal theory (Lazarus, 1991), attribution theory (Weiner, 1986), and theories of impasse/error-driven learning (De Leeuw & Chi, 2003; Kolodner, 1983, 1997; Minski, 1997; Oser & Spychiger, 2005; Van Lehn, 1988), our proposed model aims to summarize individual and contextual (pre-) conditions and self-regulation processes that are specific for individualsí learning from errors. To validate this theoretical framework and to strengthen its empirical base, we exemplarily present two studies that focused on specific parts of our proposed model.

Testing a unified model of task-specific motivation

Student learning,Emotion and affect,Learning approaches,Motivation and emotion

Cornelis de Brabander, Leiden University, Netherlands; Folke J. Glastra, Leiden University, Netherlands;

This paper tests the tenability of a Unified Model of Task-specific Motivation (UMTM). The UMTM integrates task-specific components from several theories of motivation. Core of the model are four interacting but relatively independent types of valences. Affective and cognitive valences represent expected feelings while doing an activity and thoughts about the value of its expected consequences respectively; both affective and cognitive valences can be positive and negative, hence calling for approach and avoidance motivation respectively. The interaction between these four types of valences results in a valence expectation that influences readiness for action. Task-specific antecedents, like autonomy expectation, feasibility expectation, social relatedness and subjective norm, influence valences. 441 Primary school teachers provided judgments of all components of the model except social relatedness for three imaginary professional learning activities. The three activities were framed as a school board decided, a team decided and a personally decided learning activity. Structural equation modeling showed

that for each activity a separate model was needed. Which valences influenced readiness for action, and to what extent, was specific to each activity. In the board and team decided activities, for instance, readiness for action appeared to be based predominantly on cognitive valences, while in the personally decided activity affective and cognitive valences showed a more balanced contribution. Regarding task-specific antecedents, the picture was less clear. In conclusion, the UMTM offers sound possibilities for the explanation of complex motivational phenomena and promises a significant reduction of the superabundance of theories that encumbers motivation research.

Towards an integrated model of learning and action

Student learning,Emotion and affect,Self-regulation,Motivation and emotion

Thomas Martens, Medical School Hamburg, Germany;

Most research in the field of self-regulated learning is grounded on findings from action research and has incorporated processes of metacognitive regulation. So far, self-regulation theory has not undertaken a very consequent reconstruction of motivational regulation and its neurophysiological implications. For this purpose, the Integrated Action Model presented by Martens and Rost (1998) is transferred to learning processes. Furthermore, the PSI-theory (Kuhl, 2000) added background information from neuroscience for understanding and analysing crucial motivational processes. The resulting model defines three main phases of learning: The motivation phase refers to the development of a learning motivation, i.e. the need arises to reduce a perceived learning deficit or to tackle a learning challenge. The motivation phase refers to the development of a learning motivation, i.e. the need arises to reduce a perceived learning deficit or to tackle a learning challenge. In the intention phase, an intention for learning intention is formed which can fulfil the learning motivation. In the volition phase, finally, a learning intention is translated into a real learning action. The ILMA expects three major feedback loops to each main phase of learning. Feedback loops and self-regulation processes within the volition phase are part of most self-regulation process. Feedback loops for selecting a learning method as well as for reshaping the initial motivation are ignored by most theories. The proposed model was successfully applied in different empirical contexts and could trigger more empirical research, e.g. to explain different phenomena in the field of motivational regulation, e.g. stereotype threat, reinforcement effect on motivation, procrastination and probably many more.

D 5

26 August 2015 08:45 - 10:15

Room Green_A6

Invited EARLI

Higher education

Practitioner Research to support Learning of Educational Practitioners

Keywords: Achievement,Action research,Argumentation,Artificial intelligence,Organization of educational research

Sig's: SIG 17 - Qualitative and Quantitative Approaches to Learning and Instruction

Chairperson: Inneke Berghmans, EAPRIL / EARLI Office - University of Leuven, Belgium

Organiser: Frank de Jong, Stoas Wageningen|Vilentum University of Applied Sciences and Teacher Education, Netherlands

Organiser: Inneke Berghmans, EAPRIL / EARLI Office - University of Leuven, Belgium

Discussant: Charles Max, University of Luxembourg, Luxembourg

In this symposium the nature and methods of practitioner research are explored and discussed in-depth by means of 4 practitioner research projects. The projects presented in this symposium were nominees of the 2014 Best Research & Practice Project Award, which EAPRIL awards each year. Also the winning project will be represented. With this award EAPRIL aims to recognise the best project conducted by practitioner researchers in the field of education, learning and instruction, and training and development with a clear added value to educational practice. The symposium presents the research work of Alberto Cattaneo (Switzerland, winner of the BR&PP Award 2014) about the use of video observations by VE students as a bridge between practice and VET; the work of Lieve De Wachter (Belgium) concerning an on-line writing tool to help students in their writing competencies; and the interesting Network of Innovation schools by Margus Pedaste (Estonia); Frank de Jong (The Netherlands) will present his work on competence development of preparatory/secondary VE students by doing research with company-generated questions. All presentations are exemplary for how practice-based research can elaborate ways in which this form of inquiry can be used and implemented to support learning of educational practitioners and the educational field itself. In addition to the interesting content of the presentations themselves, there will be time to set up a dialogue about: How can practitioner-research be built up? How can it be organised? How does it differ from academic or fundamental research?

Writing Aid Dutch: Developing effective process-oriented digital writing aid for university students

Qualitative methods,Quantitative methods,Educational technology,Writing/Literacy,E-learning/ Online learning,Higher education

Jordi Heeren, KU Leuven, Belgium;

Many universities and colleges are concerned about the entry-level academic writing skills of undergraduate students. Moreover, there appears to be a ëtransferí problem between the writing instructions provided by writing teachers and the actual writing products of students. Although a lot of efforts are made to explain genre characteristics to students, it turns out that students forget about these characteristics when writing their texts. A needs analysis, carried out on the basis of

academic papers of students in 2011 at the KU Leuven (Belgium) shows that especially text structure and cohesion, academic style and to a lesser extent spelling are important stumbling blocks for students (De Wachter & Heeren 2011). Based on these outcomes a digital writing aid has been developed. The tool does not correct texts but offers feedback to students and highlights possible problems and mistakes in their texts. That way, the autonomy, responsibility and self-learning process of students is stimulated (Burstein et al. 2004; William et al. 2004). A limited effect study in 2014 has shown a positive evolution in several text-aspects of texts of 34 college and university students using the digital writing tool. A questionnaire has also demonstrated that revising their texts with the writing aid is a positive experience for students as it stimulates reflection.

Mobile technologies for helping apprentice chefs to assemble learning experiences across locations

Design based research,Educational technology,Vocational education,Learning in context

Alberto Cattaneo, Swiss Federal Institute for Vocational Education and Training, Switzerland;
Elisa Motta, Swiss FederaInstitute for Vocational Education and Training (SFIVET) , Switzerland;

In dual systems for Vocational Education and Training (VET), apprentices undertake diverse experiences in the several locations in which their training takes place, like for example the company, the vocational school and ñin the Swiss VET systemñ the intercompany courses too. As a result, apprentices often suffer from the difficulty to relate experiences lived in different learning locations. Thus, starting from the general assumption that you can learn reflecting on your experiences, the potential of these experiences for learning can be augmented if apprentices are required to reflect on such experiences with their supervisors and their teachers, and to share and compare their own experiences with those of their peers. Mobile devices combined with web-enhanced learning environments can support these processes especially if embedded in powerful pedagogical scenarios. The experiences reported here shows how this approach is effective not only for supporting educational research but also for improving practice in the real field. Positive outcomes both for individual learning and for the articulation and inter-connection among the different VET system locations are reported.

Competence development of students by doing research in companies: ? longitudinal study

Quantitative methods,Competencies,Vocational education,Workplace learning

Frank de Jong, Stoas Wageningen|Vilentum University of Applied Sciences and Teacher Education, Netherlands;

Abstract In the context an educational innovation reform called ëgreen lyceumí, pre-secondary land based education students worked, beside their internship time, one day a week in companies on research questions generated by those companies. During a period of two years studentsí perception of their competence development is analysed as well as their experience of this didactical innovation. Results shows that in comparison with a reference group these students

have a more stable competence level and even develop their competence significantly. They express that this ëresearch dayí contributes to their learning. Although scores decline a bit in the long run students are quite satisfied about the teacher and companyís support, the insight it gives to their learning career and the match between school and practice. The study shows that students can get to know the world of work, the practice, in a different way than by internship only. Last but not least it is impressive what young students are able to in doing research and that It contributes to their development of how to plan and organise, direct and taking initiative for actions in a constructive and collaborative way. These are valuable competence for them as future employees in a constantly changing world of work.

Estonian Network of Innovation Schools: Building links between practitioners and academic staff

Mentoring in teacher education,Pre-service teacher education,Teacher professional development,Communities of learners,Communities of practice

Margus Pedaste, University of Tartu, Estonia;

All over the world is often recognized that educational practitioners (teachers, school leaders etc.) and academic staff of higher education institutions to not collaborate enough to initiate breakthroughs in education. In Estonia a Network of Innovation Schools was established to strengthen systematic collaboration between schools and universities as teacher educators. It adopts a teacher education paradigm of the clinician-professional model in order to initiate and disseminate educational innovation and respond to changes in society. The model specifies four dimensions of collaboration between schools and universities: traineeship, professional development, team teaching, research and development. After two years of piloting it one school and after two years of wider implementation it can be concluded that, the synergy between these dimensions is leading to innovation. In this symposium we will introduce the network and its main outcomes.

D 6

26 August 2015 08:45 - 10:15

Room Brown_B6

Symposium

Research methodology

Cross-country Comparisons of Measures in Educational Effectiveness and Teacher Education Research

Keywords: Comparative studies,Cultural psychology,Psychometrics

Sig's: SIG 18 - Educational Effectiveness

Chairperson: Ronny Scherer, University of Oslo, Norway

Organiser: Ronny Scherer, University of Oslo, Norway

Organiser: Susanne Kuger, The German Institute for International Educational Research (DIPF), Germany

Discussant: Pamela Sammons, University of Oxford, United Kingdom

In research on educational effectiveness and teacher education, there is a current trend to compare measures across countries in order to obtain international perspectives on teaching and learning. One of the most important challenges in conducting such cross-country comparisons lies in the non-invariance of models which sought to reflect the constructs measured. In fact, non-invariance compromises meaningful comparisons. The symposium sheds light of the performance of different approaches of establishing comparable measurement models across countries. Specifically, the symposium is aimed at providing substantive-methodological synergies that address cross-country comparisons of measures in research on educational effectiveness and teacher education. From a substantive point of view, the contributions are concerned with cross-country comparisons of (a) students' assessment of instruction and teaching practices; (b) teachers' perceptions of instructional quality; (c) teachers' dynamic beliefs in mathematics; and (d) teachers' response styles with respect to their assessment of personality, teaching and learning. On the basis of large-scale data sets obtained from studies such as PISA, TALIS, and TEDS-M, the contributions provide a broad repertoire of state-of-the art modeling approaches that range from multi-group confirmatory factor analysis and exploratory structural equation modeling to Bayesian models of approximate invariance. The symposium shows how substantive research on cross-country comparisons of measures in the fields of educational effectiveness and teacher education can be addressed by models that reflect substantive theory more flexibly than traditional approaches. Major implications on how to tackle comparative studies are discussed.

An international perspective on mathematics teaching

Comparative studies,Teaching/instruction,Mathematics,Secondary education

Susanne Kuger, The German Institute for International Educational Research (DIPF), Germany; Eckhard Klieme, German Institute for International Educational Research (DIPF), Germany; Svenja Vieluf, German Institute for Internat. Educational Researc, Germany; Oliver Luedtke, IPN Kiel, Germany;

Studies on teaching effectiveness assess the provision of mathematics teaching from different perspectives and aim at finding patterns of teaching in class and a universal pattern of its effect on student outcomes. The study combines three perspectives on teaching with different levels of depth, descriptions of ìopportunities-to-learnî that capture the content covered in class, mathematics teaching practices and basic dimensions of classroom quality, to analyze relations of teaching and student achievement indicators in 11 countries worldwide. Dimensions of studentsí descriptions of mathematics teaching in PISA 2012 data displayed metric measurement

invariance across all 11 countries from different cultural regions and with different teaching traditions and were analyzed in multi-group structural equation models to predict student achievement. Results indicate differential predictive power for the included descriptors of teaching that partially confirm previous knowledge about teaching cultures and additionally extend the knowledge base with regard to differences in patterns of teaching and its relation to student outcomes. Results are discussed in relation to previous findings in national and international studies.

Measuring teachersí perceptions of instructional quality across countries

Comparative studies,Quantitative methods,Teaching/instruction,Mathematics,Higher education

Ronny Scherer, University of Oslo, Norway; Malte Jansen, German Institute for International Educational Research (DIPF), Germany; Trude Nilsen, University of Oslo, Norway; Shaljan Areepattamannil, National Institute of Education (NIE), Singapore;

Our study focuses on the measurement issues of teachersí perceptions of instructional quality, which comprise three factors: classroom management, cognitive activation, and teacher support. These issues include overlaps in the conceptualizations of the instructional quality factors that complicate item-factor relations, cross-country comparisons, and estimations of relations to external variables such as teachersí self-efficacy and beliefs. Using the Teaching and Learning International Survey (TALIS) 2013 large-scale data sets of Australia, Finland, and Singapore (N = 2,313 teachers), we address the issues related to the factorial structure and measurement invariance by comparing exploratory structural equation models (ESEM) with confirmatory factor-analytic models (CFA). On the basis of invariance testing, we calculate latent means across countries as well as correlations to external variables known to be strongly correlated to instructional quality (i.e., teachersí self-efficacy and beliefs). Our results showed a substantial and significant overlap between the instructional quality factors, as indicated by cross-loadings in ESEM. Furthermore, strict measurement invariance across countries held for ESEM, whereas only metric invariance was found for CFA. On the basis of this finding, ESEM showed differences in means of teachersí perceptions across countries. Positive and significant relations were found between self-efficacy and all instructional quality dimensions, while teachers' beliefs were only positively related to cognitive activation and teacher support. Implications for the modeling of perceived instructional quality are given. The present study uses recent advances in methodology to measure teachersí perceptions of instructional quality according to substantive theory.

Does it make sense to compare teacher beliefs across countries? Only partly!

Comparative studies,Quantitative methods,Pre-service teacher education,Attitudes and beliefs,Mathematics,Higher education

Sigrid Blomeke, University of Oslo, Norway; Johan Braeken, Centre for Educational Measurement at University of Oslo (CEMO), Norway;

Scores from measures used across countries should not be distorted by country-specific differences in the measuresí meaning or participantsí response styles. With respect to achievement scores, such measurement invariance (MI) is typically examined intensely. Substantially less research exists with respect to beliefs although they are often compared across countries without further thinking. Based on data from IEAís ìTeacher Education and Development Study: Learning to Teach Mathematics (TEDS-M)î we examine how meaningful cross-country comparisons of future lower-secondary mathematics teachersí beliefs about the teaching and learning of mathematics are. Three types of MI are examined: configural, metric and scalar invariance. The latter is necessary to be able to compare means across countries. In case scalar invariance is not supported by the data, we apply two new approaches to deal with this problem: the alignment technique and the use of Bayesian distributional constraints. Whereas configural and metric invariance can be confirmed, our results point to a lack of scalar invariance such that cross-national mean comparisons would not be meaningful. Yet, the application of the two new approaches delivers a factor solution under approximate MI that makes it possible to estimate means for cross-country comparisons. Substantive implications of these results for reporting TEDS-M findings and for research on teacher beliefs in general will be discussed.

There are no effects of a general response style on cross-cultural comparisons: Evidence from TALIS

Comparative studies,Quantitative methods,Cultural psychology,Self-efficacy,Interdisciplinary

Jia He, Tilburg University, Netherlands; Fons J. R. van de Vijver, Tilburg University, The Netherlands, North-West University, South Africa; University of Queensland, Australia, Netherlands;

This paper investigated the integration of response styles and their effects on self-reports among 76,887 teachers from 18 countries in the Teaching and Learning International Survey (TALIS). Socially desirable responding (with a positive and a negative impression management factor) and 17 core constructs related to the teaching profession were measured with Likert scales; extreme and mid-point response styles were derived from these measures. A general response style was extracted with socially desirable and extreme response styles as positive indicators and midpoint response style as a negative indicator. This general response style was more strongly correlated with constructs of personal involvement, such as teacher efficacy and job satisfaction, than constructs with less personal involvement, both at individual and country level; however, statistical correction for response styles had negligible effects on the size of cross-cultural differences and country rankings in any construct. We conclude that the general response style can be interpreted as response amplification versus moderation and that there is no indication that correcting for the general response style increases the validity of cross-cultural comparisons of TALIS teacher data.

D 7

26 August 2015 08:45 - 10:15

Room Yellow_G5

Symposium

Workplace learning

Triggers, Antecedents, and Consequences of Informal Learning at Work

Keywords: Informal learning,Learning in context,Lifelong learning

Sig's: SIG 14 - Learning and Professional Development

Chairperson: Gerhard Messmann, University of Regensburg, Germany

Organiser: Gerhard Messmann, University of Regensburg, Germany

Organiser: Mien Segers, Maastricht University, Netherlands

Discussant: Christian Harteis, University of Paderborn, Germany

Due to societal, economic, and technological developments, companies are confronted with increasing knowledge-intensity and need for innovations. As a consequence, companies expect their employees to flexibly adapt to new situations and tasks and develop the necessary competences. Besides formal training, growing attention has therefore been devoted to informal learning at work, that is, all activities carried out in order to facilitate the accomplishment of one's work tasks (Tynj?l?, 2008, 2013).The symposium aims at reflecting this interest in informal learning at work by integrating investigations which approach the construct from different angles and with different methods. Providing a state of the art of research on informal learning, the symposium therefore aims at outlining starting points for future research. Furthermore, important conclusions will be drawn for educational practitioners in all kinds of organizations concerning ways of fostering informal learning and potential benefits of nurturing informal learning.To begin with, Leicher and Mulder present a study about conditions under which workplace errors trigger the engagement in informal learning activities. Next, Kyndt, Govaerts, Smet, and Dochy provide a systematic integration of quantitative and qualitative findings about antecedents of informal learning. Gerken, Messmann, Beausaert, Froehlich, and Segers then investigate informal learning itself as an antecedent and analyse how informal learning activities increase employees' readiness to engage in innovative work behaviour. Finally, Boud and Rooney integrate different qualitative findings in order to highlight how informal learning is inextricably related to work practice and, as a consequence, how attempts to formalize it are counterproductive.

Learning from errors in the retail banking sector

Quantitative methods,Social aspects of learning,Informal learning,Workplace learning

Veronika Leicher, University of Regensburg, Germany; Regina H. Mulder, University of Regensburg, Germany;

Errors can be a trigger for informal learning activities at work in the way of construction of knowledge based on an episodic event. Especially knowledge- and rule-based errors which result from problems in the intentional application of knowledge and rules contain a high potential for learning. Based on findings from studies on learning from errors at work in the domains of hospital and elder care nursing we conducted a replication study in the retail banking sector. We wanted to identify relevant individual and contextual conditions for learning from errors at work and find out if there are similar predictors for learning activities working as in the domains of nursing. Therefore we conducted a cross sectional questionnaire study in retail banking departments of a German Bank (N = 178). As in the original studies we used the vignette technique. In an interview study with experts (N = 4) of the retail banking sector we developed vignettes describing authentic examples of error situations and combined them with the questionnaire. Our results indicate that the estimation of an error as relevant for learning and the tendency to cover up an error predict client advisorsí engagement in social learning activities. There are also indirect effects of error strain and the perception of a safe social team climate on the engagement in social learning. There are major differences between the domains but with regard to learning from errors they show similar patterns and our results indicate that the same mechanisms are working.

Antecedents of informal workplace learning: A systematic review study

Meta-analysis,Informal learning,Workplace learning,Lifelong learning

Eva Kyndt, University of Leuven, Belgium; Natalie Govaerts, KU Leuven, Belgium; Kelly Smet, KU Leuven, Belgium; Filip Dochy, KU Leuven, Belgium;

During the last decennium, a substantial amount of research on the factors that influence informal workplace learning has appeared. However up to now, no effort has been done to review these findings in a systematic manner. By means of a review of current literature, the aim of this research is to address this lack and to identify barriers and facilitators of informal learning. A total of 34 quantitative and qualitative research studies met the criteria of inclusion. Using the content analysis method, the meta-synthesis identified thirteen themes that could be brought under three broad categories: personal characteristics, work environment factors, and job characteristics. Findings of the review indicate that especially a longer tenure, lack of time, and professional isolation are detrimental to informal learning. In contrast, challenging work and job variety are key enhancers to informal learning. Finally, an organisational culture and managers that are committed to and support learning at work can be seen as facilitators of informal learning.

On the relation between social informal learning activities and innovative work behaviour

Quantitative methods,Social aspects of learning,Informal learning,Workplace learning,Knowledge creation

Maike Gerken, Maastricht University, Netherlands; Gerhard Messmann, University of Regensburg, Germany; Dominik Froehlich, Maastricht University, Austria; Simon Beausaert, Universite Catholique de Louvain-la-Neuve, Belgium; Mien Segers, Maastricht University, Netherlands;

Today, employees are expected to be innovative and to come up with new ideas and strategies about products and processes. Limited research has been conducted that explores which specific social informal learning activities contribute to employeesí innovative work behaviour. The current study investigated how social informal learning, i.e. the exchange of feedback, help, and information relate to employeesí innovative work behaviour in organizations. Analyses among 229 employees in different organizations showed that especially the exchange of feedback and help influence innovative work behaviour. Understanding employeesí social informal learning activities in organizations and the relationship of these activities with innovative work behaviour is crucial because the results will indicate how to organize learning opportunities for employees in order to further develop their innovative work behaviour.

The potential and paradox of informal learning: Situating informal learning in practices

Qualitative methods,Informal learning,Workplace learning,Lifelong learning

David Boud, University of Technology, Sydney, Australia; Donna Rooney, University of Technology, Sydney, Australia;

Using the conceptual resources of practice theory (Kemmis, 2010; Schatzki, 2012), this paper problematizes the idea that informal learning is a phenomenon that can be known independently of the practices in which it is embedded. Providing multiple examples from research across a diverse range of organizational sites, the paper frames informal learning as entwined in (and inseparable from) the everyday practices of work. These everyday practices are conceptualized as Integrated Development Practices (IDPs) (Chappell et al., 2009). The paper attends to the nature of these IDPs and suggests that informal learning may fruitfully be positioned as part of the discourse of practices rather than as a feature of learning and development, as informal learning pervades practices to such an extent that it needs to be conceptualized as a fundamental part of them rather than as a separate phenomenon.

D 8

26 August 2015 08:45 - 10:15

Room Yellow_G1

Symposium

Instructional design

Learner characteristics

Keywords: Computer-assisted learning,Experimental studies,Instructional design,Multimedia learning,Teaching/instruction

Sig's: SIG 6 - Instructional Design

Chairperson: Joerg Zumbach, University of Salzburg, Austria

Organiser: Stephanie Moser, University of Salzburg, Austria

Organiser: Joerg Zumbach, University of Salzburg, Austria

Discussant: Heinz Mandl, Ludwig-Maximilians-Universitat (LMU), Germany

Knowledge acquisition is accompanied by various variables that influence learning in different ways. Main factors are learners themselves having diverse characteristics relevant for learning, e. g., motivational and emotional aspects or cognitive factors. Thus, it is important to analyse learner characteristics in order to facilitate effective learning in different learning settings. Within this symposium four different approaches are presented to investigate how learner characteristics affect learning. First Koc-Januchta et al. use eye-tracking to investigate the differences between visual and verbal learners in the way they look at pictures and text. Findings present evidence that verbalizers tend to rely on verbal information and visualizers on pictures. In the second paper Moser and Zumbach investigate the relationship between visual and verbal learning style and learning outcomes. Results show that neither implicit nor explicit measures were able to make predictions regarding learning outcomes but feedback leads to an interaction between styles and learning material. The third paper from Bwana et al. examines the influence of rhetorical structures of film trailers with regard of personality types of the audience. Empirical analyses amongst other things show that personality types predict theme comprehension and affinity. In the fourth paper Knoerzer et al. examine the influence of emotions on multimedia learning. Results indicate that the learners' emotional state is an important variable which influences learning outcomes in multimedia studies. Taken together, this symposium contributes to understand the role of different learner characteristics and provides implications for the design of learning environments based on solid empirical research.

Eye-tracking of visualizersí and verbalizersí learning behavior in text-picture combinations

Instructional design,Cognitive skills,Comprehension of text and graphics,Computer-assisted learning,Multimedia learning

Marta Koc-Januchta, Leibniz Institute for Science and Mathematics Education (IPN), Germany; Tim Hoeffler, Leibniz Institute for Science and Mathematics Education (IPN), Germany; Gun-Brit Thoma, Leibniz-Institute for Science and Mathematics Education, Germany; Helmut Prechtl, Universitat Potsdam, Germany; Detlev Leutner, University of Duisburg-Essen, Germany;

This study was conducted in order to examine the differences between visual and verbal learners in the way they look at pictures and text while learning from them. 40 college students, classified

as visualizers or verbalizers, were tested individually using an Eye-Tracker. The results showed that visualizers spent significantly more time viewing pictures than verbalizers, while verbalizers spent more time viewing texts (with large effect sizes d > 0.75). Results also suggest that visualizersí way of learning is more active (more transitions between pictures) than verbalizersí. The results can provide a valuable input for adapting teaching methods to different learners.

Explicit and implicit measuring of visual and verbal learning styles

Experimental studies,Instructional design,Comprehension of text and graphics,Social sciences,Computer-assisted learning,Multimedia learning

Stephanie Moser, University of Salzburg, Austria; Joerg Zumbach, University of Salzburg, Austria;

This research addresses the role of visual and verbal learning styles in multimedia learning. It is still unclear if learning styles are unchangeable dispositions or flexible characteristics. Thus, this work focuses on the development of learning styles and presents a new concept: the Learning Styles Genesis Model (LSGM), which includes explicit and implicit processes. Here, an implicit learning style measurement was developed and evaluated. Furthermore, we investigated the relationship between learning style and learning outcomes. For this purpose a computer-based learning environment was developed in two versions (either visually or verbally presented information). Results show that matching learning environment and learning style does not result in better learning outcomes or in different cognitive load. In a second study, we investigated the influence of external feedback and included self-efficacy. Learners received faked feedback regarding their learning style (e.g., they were randomly told that they were Visualizers or Verbalizers). Results indicate that this manipulation leads to different values in the implicit measurement before and after the feedback. In addition, results reveal that the experimental manipulation influences learning outcomes and learnersí self-efficacy, in particular Visualizers seem to be affected by the treatment.

The effect of movie trailersí rhetorical structures on shared meaning and affinity

Experimental studies,Student learning,Comprehension of text and graphics,Emotion and affect,Interdisciplinary,Multimedia learning

Christina Bwana, California State University, Chico, Tanzania; Neil Schwartz, California State University, United States; Erica de Vries, Universite Pierre-Mendes-France, France;

This study was designed to examine the influence of rhetorical structures of film trailers on an audience, measured by i) the audience comprehension of the plot and theme within a trailer, and ii) the audience reaction towards the trailer, measured by affinity towards the trailer, viewing desire, viewing intention and intention to share the trailer. There were four experimental conditions, which were the four rhetorical structures of a single trailer: narrative, descriptive, original and control. Instruments to measure comprehension and reaction were created specifically for this experiment, and analysed using multivariate analysis of covariance. Results showed a significantly greater influence of the narrative structure on comprehension of theme,

and on affinity towards the trailer, as compared to the other three structures. Simultaneous regressions showed that the personality types of Openness and Conscientiousness, as measured on the BFAS personality instrument, were significant predictors of theme comprehension and affinity, respectively. A film audience would be more likely to understand the themes of a trailer as intended by the author, and like the trailer, if the story is presented directly and clearly.

Learner characteristics moderate the influence of emotions on multimedia learning

Experimental studies,Quantitative methods,Instructional design,Emotion and cognition,Multimedia learning

Lisa Knoerzer, Saarland University, Germany; Roland Bruenken, Saarland University, Germany; Babette Park, Saarland University , Germany;

Based on the theoretical framework of the Cognitive-Affective Theory of Learning with Media (CATLM; Moreno, 2006), the present study investigates the influence of emotions on multimedia learning and how learner characteristics regarding cognitive resources (prior knowledge and working memory capacity), emotion regulation strategies (suppression and reappraisal) and personality traits (openness and neuroticism) moderate this effect. Learners were randomly assigned to one of three experimental groups receiving a positive, neutral or negative mood induction (Eich et al., 2007) and learning with a multimedia instruction. Learning performance was lowest for learners in a positive emotional state and highest for learners in a negative emotional state before learning. Regression-based moderation analyses revealed that learners with high prior knowledge, a distinctive emotion regulation strategy (either reappraisal or suppression) or high openness values were less influenced by their emotional state before learning. In sum, the learnersí emotional state is an important factor which should be considered in multimedia studies. Additionally, learner characteristics can be highlighted as important variables influencing learning outcomes and moderating the emotionsí impact on learning.

D 9

26 August 2015 08:45 - 10:15

Room Green_A1

Symposium

Mathematics education

Living apart together? The long and winding road from natural to rational number understanding

Keywords: Cognitive development,Mathematics,Misconceptions,Primary education,Quantitative methods,Student learning

Sig's: SIG 3 - Conceptual Change

Chairperson: David Maximiliano Gomez Rojas, Universidad de Chile, Chile

Organiser: David Maximiliano Gomez Rojas, Universidad de Chile, Chile

Organiser: Wim Van Dooren, KU Leuven, Belgium

Discussant: Matthew Inglis, Loughborough University, United Kingdom

Children start learning about rational numbers after having spent years working with natural numbers. Although rational numbers involve learning various new concepts and procedures, most children intuitively try to apply their natural-number-based knowledge to the novel rational numbers, often leading them astray. Interestingly, such intuitive reasoning has been shown to prevail even in mathematically-trained adults. In recent years, the learning and cognitive gaps between natural and rational numbers and the interference of natural number understanding have received a lot of research attention, as for instance shown by various EARLI symposia and an upcoming special issue of Learning and Instruction. Nonetheless, it is not always the case that natural and rational number knowledge oppose one another. Identifying in which circumstances and in which ways natural number knowledge conflicts with or potentiates the understanding of rational numbers may prove essential to mathematics educators. In this symposium, we aim at shedding light on the sometimes troubled relation between natural and rational number knowledge, by looking at the influence of natural number knowledge and at processing strategies in different tasks requiring reasoning about or with rational numbers. More specifically, this symposium's presentations will address: how primary school children deal with simple equations whose solutions are natural or rational numbers; the existence of a specific link between natural number and rational number knowledge; how students' spontaneous focusing tendencies predict rational number knowledge development; and how the analysis of eye movements can reveal mental processing strategies about how to add fractions.

Number sense in the transition from natural to rational numbers

Quantitative methods,Student learning,Numeracy,Mathematics,Primary education

Jo Van Hoof, KU Leuven, Belgium; Lieven Verschaffel, KU Leuven, Belgium; Wim Van Dooren, KU Leuven, Belgium;

Understanding rational numbers is of critical importance both in mathematics and in other fields of science. However, they form a stumbling block for learners. One widely known source of the difficulty learners have with rational numbers is the natural number bias, i.e. the tendency to (inappropriately) apply natural number properties in rational number tasks. Still, it has been shown that a good understanding of natural numbers is highly predictive for mathematics achievement in general, and for performance on rational number tasks in particular. In this study, we further investigated the relation between learnersí natural and rational number knowledge, specifically in cases where a natural number bias may occur. 140 sixth graders completed a symbolic and a non-symbolic natural number comparison task, two natural number line estimation tasks, and a rational number sense test. Learnersí natural and rational number knowledge were positively correlated. The relation was however fully mediated by learnersí

general mathematics achievement, suggesting that there is no direct effect of learnersí natural number knowledge on their rational number knowledge.

The dual aspect of natural number bias in arithmetic operations with missing numbers

Experimental studies,Quantitative methods,Student learning,Misconceptions,Mathematics,Primary education

Konstantinos Christou, University of Western Macedonia , Greece;

Understanding rational numbers is difficult to achieve. This paper deals with two aspects where the difficulty occurs, i.e. doing operations with numbers and interpreting missing numbers. In both aspects a natural number bias may create the difficulty, but the underlying mechanism is somewhat different. The main hypothesis of the study was that the students would tend to think of missing numbers as natural numbers and they would anticipate specific results of each operation in line with their intuitions (i.e., that multiplication always makes bigger and division always makes smaller). Specifically designed tasks were administered to 189 5th and 6th grade students, in a paper and pencil test. These tasks were either in-line with the studentsí intuitions about the effects of operations (congruent tasks) or not in-line (incongruent tasks). The results provide quantitative data suggesting that there is a natural number bias for operations with numbers which acts on two main ways: it forms studentsí intuitions about the effect of arithmetic operations, and also influences their selection of natural numbers as the only kind of numbers to substitute for the missing numbers which reflects on their decision about the general effects of operations based on the result of the specific substitutions. Results about the way this bias correlates with other aspects of studentsí understanding of the number concept, such as the ordering and the density of rational numbers, will also be presented, and theoretical and educational implications will be discussed.

Spontaneous focusing on numerosity and quantitative relations and rational number development

Student learning,Cognitive development,Conceptual change,Mathematics,Primary education

Jake McMullen, University of Turku, Finland; Xenia Vamvakoussi, University of Ioannina, Greece; Erno Lehtinen, University of Turku, Finland; Minna M Hannula-Sormunen, University of Turku, Finland;

It has previously been shown that childrenís tendency of spontaneous focusing on numerosities (SFON) or quantitative relations (SFOR) are related to later fraction knowledge (McMullen et al., submitted; McMullen, 2014). So far the contributions of SFON and SFOR in rational number development have been studied separately. In the present, longitudinal, study with 263 primary school students, we examined a) how the two tendencies relate to each other in tasks in which numerosity as well as multiplicative relations are relevant, and b) how they impact rational number knowledge development. Participants completed measures of SFON/SFOR and rational number knowledge at the start of the spring term and a similar measure of rational number knowledge at the end of the spring term the following year. Results indicate that when

numerosity is the most salient mathematical feature of the task then SFON responses are more likely, particularly for younger students; and that, as expected, in tasks in which both numerosities and multiplicative quantitative relations are relevant, SFOR tendency is a stronger predictor of rational number development than SFON. These results suggest an interrelation between SFON and SFOR in relation to the development of rational number knowledge.

How the eyes add fractions

Experimental studies,Quantitative methods,Reasoning,Mathematics

Andreas Obersteiner, Technische Universitat Munchen (TUM), Germany; Isabella Staudinger, Technische Universitat Munchen, Germany;

Fraction arithmetic is an essential component of mathematical competence in the domain of numbers. However, many students have large difficulties in this domain, often because they treat fractions as two natural numbers rather than as one (rational) number. A widespread mistake with adding two fractions seems to be due to a componential strategy, in which the numerators and the denominators of the two fractions are simply added (e.g., 1/2+2/3=3/5). However, studentsí answers to specific problems do not always allow conclusions concerning the strategy they used, and verbal reports are not always a reliable method either. Eye tracking has already been used successfully for assessing individual strategies in comparing the numerical values of fractions (e.g., which is larger, 1/2 or 2/3). The present study goes one step further and assesses eye movements in fraction addition tasks. Twenty-three university students were asked to solve fraction addition tasks of different types, which were assumed to require different comparison strategies. We found that fixation times on numerators and denominators corresponded to the expected strategies. Individual scan paths also allowed distinguishing strategies for different item types. Based on these results, we discuss the feasibility of using eye tracking for assessing strategy use in fraction arithmetic also in primary and secondary school students.

D 10

26 August 2015 08:45 - 10:15

Room Green_A2

Symposium

Knowledge creation

Promoting knowledge work practices in education - methods and case studies

Keywords: Competencies,Computer-supported collaborative learning,Cooperative/collaborative learning,Design based research,Knowledge creation,Student learning

Sig's: SIG 17 - Qualitative and Quantitative Approaches to Learning and Instruction

Chairperson: Klas Karlgren, Karolinska Institutet, Sweden

Organiser: Klas Karlgren, Karolinska Institutet, Sweden

Organiser: Liisa Ilomaki, University of Helsinki, Finland

Discussant: Crina Damsa, University of Oslo, Norway

Today's students have to tackle jobs that are profoundly different from existing ones, and secondary and higher education are faced by challenging expectations of supporting students in acquiring competencies in using technologies for collaborative knowledge creation and innovation. The aim of this symposium is to discuss methodological issues and empirical findings concerned with how students' knowledge-work practices in educational settings can be promoted. The presenters from four countries have theoretically based their work on the Trialogical approach on learning and its design principles (Paavola et al., 2011) developed for design and analysis of collaborative knowledge practices: 1. Organizing activities around shared objects refers to anchoring efforts around "objects" such as reports, products, or services. 2. Supporting integration of individual and collective knowledge practices and agency so that students take responsibility for both own learning and collective processes. 3. Emphasizing development and creativity through transformations and reflection. 4. Fostering sustained processes of knowledge advancement with shared objects to ensure later use of the produced outcomes. 5. Promoting cross-fertilization of knowledge practices and artifacts across communities and institutions. 6. Providing flexible tools for developing artefacts and practices. Each presentation contributes to our understanding of collaborative knowledge creation practices in education and the contributions have high educational relevance by presenting a concrete instrument and empirical results from different educational levels. Key reference Paavola, S., Lakkala, M., Muukkonen, H., Kosonen, K., & Karlgren, K. (2011). The roles and uses of design principles for developing the trialogical approach on learning. Research in Learning Technology, 19(3).

The trialogical approach: An Italian case study

Case studies,Educational technology,Competencies,Vocational education,Knowledge creation

Nadia Sansone, Sapienza University of Rome, Italy; Maria Beatrice Ligorio, University of Bari, Italy; Donatella Cesareni, University of Rome, Italy;

This paper describes a case study in which the so-called Trialogical Learning Approach (TLA) has been applied into vocational education and training. To this aim, a set of individual and collaborative technology-supported activities were orchestrated, leading to the creation of a shared and meaningful object. After describing the case, we will illustrate the method we developed to assess the impact of TLA. Rich observational and ethnographic data has been collected, by involving the three main actors of the activities: the students, the teacher, and the researchers. The aim of the method is to maintain their points of view and ñ at the same time ñ to gather a general overview of the case. For each type of data, we developed a specific codebook, starting from the TLA principles. Results from the quali-quantitative analysis suggest that: a)

students developed skills related to collaborative work; b) teachers changed their practices, focusing more on cooperation and studentsí active role; c) technology was no longer conceived as a tool to be learned and became a tool to perform collaborative activities. Being the codebooks TLA-based, a final triangulation of the results was possible, suggesting that technology and object-related collaborative work were the main flywheel triggering changes in teaching and learning practices. This method allowed us to preserve the specificity of each point of view and the complexity of the case study. Furthermore, we could collect feedback useful for the re-design of the activity, as suggested by the Design Based Research.

Creating a questionnaire for investigating knowledge work practices and competencies in higher ed.

Mixed-method research,Student learning,Competencies,Interdisciplinary,Higher education,Cooperative/collaborative learning

Hanni Muukkonen, University of Helsinki, Finland; Minna Lakkala, University of Helsinki, Finland; Klas Karlgren, Karolinska Institutet, Sweden; Liisa Ilomaki, University of Helsinki, Finland; Auli Toom, University of Helsinki, Finland;

This paper presents the development process of a questionnaire, the Contextual Knowledge Work Practices Questionnaire, which is designed for investigating studentsí self-reported evaluation of collaborative working practices and competence development in courses. In particular, aspects of collaboration and the use of digital technology are targeted; these are considered central in modern knowledge work. For instance learning to collaborate on shared objects (e.g., reports, products, designs), iterative development through feedback, integrating individual and collaborative working, understanding various disciplines and practices, interdisciplinary collaboration and communication, and learning to exploit technology. Based on the theoretical framework of the Trialogical approach on learning, a first long version of the questionnaire was designed and piloted. Next, a shortened questionnaire was administered to two other sample groups of higher education students, with two additional items. We obtained satisfactory scale reliabilities for the scales also with the second sample. The questionnaire provides a tool to be used in combination with other indicators or sources of assessment, e.g., teachersí assessment of team outcomes and processes, peer and self-assessment, and documentation of course practices by teachers or researchers. It is essential to further validate the questionnaire in various collaborative working and learning contexts.

Promoting knowledge work practices in health informatics education: Studentsí and teachers' views

Mixed-method research,Student learning,Competencies,Higher education,Computer-supported collaborative learning,Cooperative/collaborative learning

Elnta Meragia, Karolinska Institutet, Sweden;

This study demonstrates a novel way of transforming a master course in health informatics education based on the Trialogical learning approach. Tools for collaboration were provided and

collaborative student activities were organized aiming at the creation of a number of shared objects. The aim was to investigate the extent to which the Trialogical approach of learning could be applied in health informatics by assessing how students and the teacher experienced Trialogical learning. The course was redesigned, and in order to assess the overall impact of the Trialogical learning approach, it was decided to collect data throughout the course and not only in the end of it. Rich data were collected from both the teacher and the students (on an individual and group basis) in the form of interviews, questionnaires and observations. Results suggest that the implementation of the Trialogical approach of learning does have an impact but its implementation requires careful consideration and planning. There seems to be a need for developing modern knowledge work practices throughout health informatics education and the implementation of Trialogical learning in the specific course was received quite well by both the teacher and the students despite some initial concerns that some students would have trouble working in groups. The overall experience from the study gave us important insights about the implementation of Trialogical approach of learning. Useful lessons were learned on both theoretical and practical levels and which can help us design courses using the Trialogical approach of learning more effectively in the future.

Promoting knowledge work practices in upper secondary schools: case studies in Finland and Bulgaria

Mixed-method research,Student learning,Competencies,Physical Sciences,Secondary education,Knowledge creation

Liisa Ilomaki, University of Helsinki, Finland; Stela Stefanova, The Technology school ìElectronic systemsî, Bulgaria; Tania Vasileva, The Technical University of Sofia, Bulgaria; Minna Lakkala, University of Helsinki, Finland;

The exploratory case study was conducted in two upper secondary schools, in Helsinki and in Sofia. The aim was to promote studentsí knowledge work competencies, and for that, teachers re-structured obligatory courses following the Trialogical Design Principles. The courses were organized in the form of studentsí collaborative inquiry and project work. The research questions were: 1) how did students evaluate the learning of knowledge work competencies and the courses, and 2) how did teachers evaluate the collaborative planning and realization of the courses.The data consisted of studentsí (N=76 and N=52) self-evaluation answers to pre- and post-questionnaires as well as teachersí (N=4) interviews and teaching plans. The analysis methods included statistical and qualitative content analysis. The results showed that studentsí experiences were very positive, but they also found shortcomings in their knowledge work competencies. Teachers were similarly satisfied, but they found problems in collaborative planning towards the end of the process (in Helsinki) and in organizing studentsí team work and in reporting the contributions (in Sofia). All teachers will continue the new pedagogical practices. The design principles were useful as a collaborative guiding tool for teachersí planning, but there is a need to model the concrete collaboration activities for pedagogical design.

D 11

26 August 2015 08:45 - 10:15

Room Blue2_D1

Symposium

Cognitive development

Number sense: its nature, measurement and predictive power

Keywords: Cognitive development,Experimental studies,Mathematics,Neuroscience,Numeracy

Sig's: SIG 22 - Neuroscience and Education

Chairperson: Ernest Van Lieshout, VU Univeristy Amsterdam, Netherlands

Organiser: Ernest Van Lieshout, VU Univeristy Amsterdam, Netherlands

Discussant: Bert De Smedt, University of Leuven, Belgium

Humans, like some animals, seem to be endowed by an innate cognitive system for the perception and comparison of non-symbolic numerosities (i.e. sets of objects). Related to this are tasks in which symbolic numerosities, i.e. Arabic numbers, have to be compared. To date, there are several unresolved questions about what the nature of these non-symbolic and symbolic numbers sense skills is and how predictive they are of later mathematical knowledge. If number sense is ëhard-wired' in our brain, would that not mean that e.g. non-symbolic skills are automatic? Or are there also other abilities involved that are acquired by experience or education, e.g. knowledge of number symbols and number order? There is evidence for the role of working memory in non-symbolic and symbolic skills, but is their predictive power independent from working memory? Further, a multitude of experimental tasks are used in different studies probably tapping different cognitive processes. Do they influence the prediction of math achievement? These questions will be the topic of this symposium. The answers to these questions are important in order to be able to understand, predict and foster mathematical knowledge.

Neural adaptaton to symbolic and non-symbolic numerosity: EEG studies

Experimental studies,Neuroscience,Cognitive skills,Numeracy,Mathematics,Higher education

Denes Szucs, University of Cambridge, United Kingdom; Fruzsina Soltesz, Universitiy of Cambridge, United Kingdom;

Several studies assumed that the analysis of non-symbolic numerical information happens in a fast and automatic manner in the human brain. These conclusions raised hopes to develop educational interventions for weak mathematical achievement relying on strengthening non-symbolic number processing. In fact, such applications already exist and are already in use in

schools. Hence, validating these conclusions is important for educational practice. Here, utilizing the high temporal resolution of electroencephalography (EEG) we tested neural adaptation responses to symbolic and non-symbolic stimuli. In a non-numerical discrimination paradigm symbolic digits elicited reliable adaptation signals. Adaptation signals to non-symbolic stimuli were evoked in a passive oddball adaptation paradigm with unattended shape changes and unattended numerosity changes. We controlled visual stimulus properties in a stringent manner. Unattended changes in shape elicited significant, gradual adaptation effects in the range of early visual components, indicating the fast and automatic processing of shapes. Changes in numerosity did not elicit significant changes in these early ERP components. Number change elicited gradual ERP effects only on late ERP components. We conclude that non-symbolic numerosity is a higher-level property assembled from naturally correlating perceptual cues and hence, it is identified later in the cognitive processing stream. In contrast, symbolic numbers had both early (200 ms) and late (400 ms) adaptation signals demonstrating faster access to meaning representation. Our data suggest that non-symbolic number representations cannot be considered a default, basic type of representation. it seems more important to strengthen symbol to quantity links rather than training non-symbolic number comparison per se.

An individual differences approach to unpacking symbolic number comparison

Experimental studies,Neuroscience,Cognitive skills,Numeracy,Mathematics,Higher education

Delphine Sasanguie, KU Leuven, Belgium; Ian Lyons, The University of Western Ontario, Canada; Bert De Smedt, University of Leuven, Belgium; Bert Reynvoet, KU Leuven - Kulak Kortrijk, Belgium;

Symbolic ñ or digit ñ number comparison has been a central tool in the field of numerical cognition for decades. More recently, individual differences in performance on this task have been shown to be robustly related to individual differences in more complex math processing ñ a result that has been replicated across many different ages. In this study, we unpack the underlying components of digit comparison. We show that digit comparison performance is most strongly related to digit ordering ability ñ i.e., the ability to judge whether symbolic numbers are in numerical order. Furthermore, path analyses showed that the relation between digit comparison and arithmetic is partly mediated by order processing tasks. Interestingly, this mediation effect was driven by unique contributions made by both numerical and non-numerical (letter) ordering tasks. This suggests that digit comparison predicts arithmetic ability in part because it taps into both numerically specific and more domain-general ordinal processing. Finally, the mediation result was only partial, indicating that the relation between digit comparison and arithmetic is not fully subsumed by ordinal processing ñ i.e., there remains an aspect of the variance uniquely captured by comparing relative symbolic magnitudes.

Number sense development from kindergarten to second grade: Factors and developmental paths

Cognitive development,Cognitive skills,Numeracy,Mathematics,Early childhood education,Primary education

Ilona Friso-van den Bos, Utrecht University, Netherlands; Johannes Van Luit, Utrecht University, Netherlands; Evelyn Kroesbergen, University of Utrecht, Netherlands; Iro Xenidou-Dervou, VU University Amsterdam, Netherlands; Lisa Jonkman, Maastricht University, Netherlands; Menno van der Schoot, VU University Amsterdam, Netherlands; Ernest Van Lieshout, VU Univeristy Amsterdam, Netherlands;

Number sense has been argued to be a key factor in the development of mathematical proficiency. However, the structure of number sense, as well as its capacity to identify pupils at risk for failure in mathematics, have been debated. In this presentation, data from two studies are presented, and ambiguities in the literature are addressed. In Study 1, scores on various number sense tests of 441 kindergartners were subjected to factor analysis, revealing two distinct factors, which were labeled as symbolic and non-symbolic number sense. In Study 2, growth trajectories in number sense were investigated using latent class growth analysis of scores on a number line task, and predicted from the factors identified in Study 1. Three groups of pupils were identified: a group of high or typically performers, a catch-up group, and an at-risk group. Growth parameters could be predicted by both symbolic and non-symbolic number sense in kindergarten, and all groups differed in mathematics performance at the end of the study. Results of these studies have implications both for the often-assumed distinction between symbolic and non-symbolic number sense, and for the use of number sense measures as a means to identify children at risk for failure in mathematics at an early age.

Longitudinal Development of Nonsymbolic and Symbolic Comparison Skills: Moving Forward

Cognitive development,Cognitive skills,Numeracy,Mathematics,Early childhood education,Primary education

Iro Xenidou-Dervou, VU University Amsterdam, Netherlands; Daniel Ansari, The University of Western Ontario, Canada; Dylan Molenaar, University of Amsterdam, Netherlands; Menno van der Schoot, VU University Amsterdam, Netherlands; Ernest Van Lieshout, VU Univeristy Amsterdam, Netherlands;

What developmental roles do nonsymbolic (e.g., dot arrays) and symbolic (i.e., Arabic numerals) magnitude comparison skills play as precursors of childrenís mathematics achievement? To date, the literature has yielded a patchwork of findings. Notably, different studies have been assessing children of different ages, with different task-formats and domain-general capacities were rarely controlled for. Furthermore, the issue of how childrenís individual patterns of growth in these skills relate to their future math achievement had not been previously addressed. We assessed a large sample (N = 444) in kindergarten, grade 1 and grade 2 on two well-known nonsymbolic and symbolic magnitude comparison task-formats: one entails simultaneously presented small numerosities, the other sequentially presented large numerosities. The two task-formats and two stimulus-formats demonstrated different developmental trajectories. Symbolic processing demonstrated larger developmental improvements than nonsymbolic. Kindergartenersí accuracy in all four measures correlated with their future math achievement. More importantly, childrenís individual developmental growth primarily in the symbolic sequential-large task also predicted their future math achievement. Analyses, where WM capacity and initial IQ were controlled for,

revealed how the targeted predictive relationships dynamically change over time. In kindergarten and grade 1, both nonsymbolic and symbolic magnitude processing uniquely predicted future math achievement. In grade 2, however, it was only predicted by symbolic processing. Symbolic magnitude processing was consistently a stronger predictor of future math achievement compared to nonsymbolic but the latter also played an important role. The present study explains and reconciles existing contradictions and proposes a unitary view.

D 12

26 August 2015 08:45 - 10:15

Room Brown_B5

Symposium

Emotion and affect

Activity Related Achievement Emotions and Learning Outcome

Keywords: Emotion and affect,Emotion and cognition,Experimental studies,Teaching/instruction

Sig's: SIG 8 - Motivation and Emotion

Chairperson: Hannes Muenchow, University of Wuerzburg, Instructional Media, Germany

Organiser: Hannes Muenchow, University of Wuerzburg, Instructional Media, Germany

Organiser: Maria Bannert, Mensch-Computer-Medien, Germany

Discussant: Reinhard Pekrun, Ludwig-Maximilians-Universitat (LMU), Germany

Achievement emotions which can be defined as emotions that are linked to achievement situations (Pekrun, 2006) crucially influence learning performance. Achievement emotions can be further distinguished in outcome or activity emotions. Outcome emotions refer to anticipated or actual results of achievement situations such as school grades. Activity related achievement emotions otherwise occur while learning and change dynamically in the achievement situation. These affective states can directly impact learning-related cognitive, metacognitive and motivational processes such as comprehension, reasoning, self-regulation or achievement motivation (Pekrun & Stephens, 2011). Research in learning and instruction seeks not only to understand the mechanisms underlying these relations but also to identify and foster affective states that are beneficial for learning.The contributions of the symposium will present empirical findings on affective states in learning situations with regard to different levels of learning outcome and interacting factors. Thereby, the influence of observed achievement emotions and induced positive affective states on performance is examined. Moreover, the role of fear appeals on the learners' motivation and gender differences in the perception of achievement emotions are taken into account. Furthermore, different types of learning including multimedia learning,

learning with intelligent tutoring systems and learning using a portfolio approach are addressed in the symposium. The symposium therefore aims to give deeper insight in the role of emotions in the learning situation. The empirical and educational significance of the works will be discussed.

Monitoring and regulating emotions between humans and pedagogical agents with MetaTutor

Experimental studies,Emotion and cognition,Metacognition,Science education,Higher education,Computer-assisted learning

Roger Azevedo, North Carolina State University, United States; Michelle Taub, North Carolina State University, United States; Nicholas Mudrick, North Carolina State University, United States; Seth Martin, North Carolina State University, United States; Jesse Farnsworth, North Carolina State University, United States;

The current study examined the relationship between undergraduatesí (N = 150) self-reported emotions and affective states while they learned about a complex science topic with MetaTutor, a multi-agent intelligent tutoring system. Learners were randomly assigned to either a control (no pedagogical agents) or an experimental group (received learning prompts and feedback regarding their use of cognitive and metacognitive SRL processes from four pedagogical agents) during a two-hour session. Several types of data were collected from each participant at various points throughout the learning session. For example, self-report questionnaires (e.g., AEQ) of emotions and motivation were collected at pre-determined time points (e.g., every 14 minutes); process data (i.e., log-files, facial expressions of emotions, eye-tracking, and electrodermal data) were collected during the learning session; and, learning outcomes were collected both prior to and following the learning session. Overall, those assigned to the experimental group learned significantly more than those in the control condition. In addition, significant relationships for a subset of basic (e.g., anger) and learning-centered emotions (e.g., confusion) were found for the four agents though the relationships differed between pedagogical agents (e.g., more negative affect towards Sam the Strategizer than Mary the Monitor). Micro-analyses of learner-agent interactions provide evidence of quantitative and qualitative changes in learnersí appraisals over time based on the type of agent (e.g., Mary the Monitor vs. Sam the Strategizer), duration of affective state, behavioral signatures of specific affective states, and time-dependent mechanisms used to regulate specific affective states (from first interaction with an agent vs. subsequent interactions).

Enhancing learning outcome by inducing positive affect through the learning material

Experimental studies,Instructional design,Emotion and affect,Social sciences,Higher education,Multimedia learning

Christoph Mengelkamp, University of Wuerzburg, Germany; Maria Bannert, Mensch-Computer-Medien, Germany; Hannes Muenchow, University of Wuerzburg, Instructional Media, Germany;

The present study examines the influence of positive activating affect during hypermedia learning on performance in terms of comprehension and transfer. A total of 111 undergraduate students from a German university were randomly assigned to either a hypermedia learning environment designed to induce positive activating affect through the use of ëwarmí colors and rounded shapes (n = 61) or a neutral environment that used achromatic colors and sharp edges (n = 50). Participants learned about the topic of functional neuroanatomy for 20 minutes and had to answer a performance test afterwards. Affective states were investigated before and after the training phase using questionnaires. The results show that participants in the affective positive hypermedia-based learning environment were better in comprehension as well as transfer when initial negative and positive affect was strong. Pre-experimental affect was a predictor of comprehension and a moderator for transfer. The findings therefore support the idea that positive affect, induced through the design of a hypermedia-based learning environment, can facilitate performance if initial affective states are taken into account.

The role of buoyancy in the appraisal of fear appeals as threatening or challenging

Quantitative methods,Teaching/instruction,Emotion and cognition,Secondary education,Motivation and emotion

Wendy Symes, Ludwig-Maximilians Universitat (LMU), Germany; Dave Putwain, Edge Hill University, United Kingdom;

Fear appeals are persuasive messages teachers may use prior to high stakes exams to motivate their students. Fear appeals focus on the consequences of failure and/or the courses of action likely to result in failure. Previous research has shown that fear appeals can be appraised by students as threating, challenging, or irrelevant. The current study investigated whether academic buoyancy might moderate the appraisal of fear appeals as threatening or challenging. 584 secondary school students studying for high-stakes examinations in mathematics took part in this cross-sectional study. Students high in academic buoyancy were less likely to appraise fear appeals as threatening, and more likely to appraise them as challenging than students with low academic buoyancy. However, the impact of buoyancy differed with the frequency of fear appeals used. Theoretical and educational implications are discussed.

Achievement emotions of girls and boys in Physics instruction ñ Does a portfolio make a difference?

Experimental studies,Teaching/instruction,Emotion and affect,Physical Sciences,Secondary education

Susi Limprecht, Institute of Educational Science, Germany; Michaela Glaeser-Zikuda, University of Erlangen-Nuremberg, Germany;

Science instruction is often connected with negative emotions of students, especially when considering gender differences. The aim of the research project ìPromoting Student/s Learning Competencies based on the Portfolio-Approachî, founded by the DFG (German Research Foundation) is enhancing positive achievement emotions, and reducing negative achievement

emotions in Physics instruction implementing a portfolio based learning environment. The quasi-experimental intervention study analyzes the impact of a portfolio regarding studentsí achievement emotions, students/ learning outcome, and problem solving competencies. In this presentation, we especially focus on the hypothesized impact of the portfolio on boysí and girlsí achievement emotions. The Physics instruction focused on the topic of electricity. The research sample consisted of N = 161 students from eight 8th grade classrooms of three grammar schools in Germany which were divided into treatment and control groups randomly. Covariance and multivariate analyses were carried out to test the hypothesized effects of the intervention. The same teacher taught one treatment and one control group. The results show that self-concept and interest are significant covariates influencing studentsí achievement emotions. It was confirmed that boys generally experience more positive achievement emotions in Physics than girls, whereas girls showed higher level of anxiety and boredom than boys. Differences between boys and girls regarding their positive achievement emotions in Physics instruction have been slightly reduced by the intervention. Potential of the intervention, as well as limitations of the study, and implications for instructional development will be discussed.

D 13

26 August 2015 08:45 - 10:15

Room Cyan_F1

Symposium

Motivation

Resilience in Education - What We Know and What We Do

Keywords: Motivation and emotion,Pre-service teacher education,Primary education,Teacher professional development,Vocational education

Sig's: SIG 8 - Motivation and Emotion

Chairperson: Marold Wosnitza, RWTH Aachen University, Germany

Organiser: Marold Wosnitza, RWTH Aachen University, Germany

Organiser: Francisco Peixoto, ISPA - Instituto Universitario / U.I.P.C.D.E., Portugal

Discussant: Margaret O'Donnell , St. Patricks College, Ireland

Research on resilience in the educational context has increased considerably over the last decade, generating various models of resilience. Among these, there is a tendency to understand resilience as a multidimensional construct that is fluctuating and can thus be improved by training. Following this understanding, research on resilience has two foci: the description and understanding of the interplay of the dimensions of resilience and how it is influenced on the one

hand and the ways to enhance resilience in diverse educational contexts on the other. The independent and collaborative work of the participants of this symposium thus cover "what we know" about resilience and "what we do" with this knowledge in the educational context. Paper one provides data supporting a multidimensional model of teacher resilience as a construct of interrelating capacities, beliefs and behaviours, embedded in its specific context. The second paper explores resilience of apprentices as a multi-dimensional construct. The focus lies on the role resilience might play with regard to apprentice drop-out. The objective of paper three is the implementation of a resilience curriculum in primary education in six European countries. This paper focuses on how to develop learners' competencies needed to achieve academic success as well as social and emotional wellbeing.. The Australian participants of this symposium finally present the results of a first implementation of online training modules for pre-service teachers to enhance their teacher resilience.

A multi-dimensional view on teacher resilience in Germany, Ireland, Malta and Portugal

Quantitative methods,Pre-service teacher education,Teacher professional development,Attitudes and beliefs,Emotion and cognition

Francisco Peixoto, ISPA - Instituto Universitario / U.I.P.C.D.E., Portugal; Marold Wosnitza, RWTH Aachen University, Germany; Margaret Odonnell, St. Patricks College Dublin, Ireland; Carmel Cefai, University of Malta, Malta; Jose Castro Silva, ISPA - Instituto Universitario / U.I.P.C.D.E, Portugal;

An alarming number of teachers are suffering from strains and stresses and a significant number of teachers leave their profession before being of pensionable age because of stress-related psychological and psychosomatic illnesses. The challenge of retaining efficient teachers has internationally become an important educational issue. In this paper we are presenting results from an on-going survey study in four different countries (Germany, Ireland, Malta, and Portugal) on teacher resilience that focuses on the interplay in this complex variable structure and is part of the EU-funded project ENTREE (Enhancing Teacher REsilience in Europe). This study addresses the following three major research questions: a) Can the postulated constructs be measured in the four different countries? b) How do these variables interact? c) Can country-specific aspects be identified or is the structure generalizable between these four countries? The study showed that there is an interplay between resilience capacities, beliefs and behaviour. The results furthermore indicate that resilience is influenced by the context in which teachers live and work. The country-specific interplay of resilience dimensions emphasizes this influence of different contexts as postulated in the theoretical framework.

Towards the conceptualization of apprentice resilience ñ An interview study

Content analysis,Qualitative methods,Vocational education,Motivation and emotion

Jennifer Schwarze, RWTH Aachen University, Germany; Marold Wosnitza, RWTH Aachen University, Germany;

Research on resilience in the educational context has increased considerably over the last years and produced various understandings and conceptualizations. What has not been examined so far is resilience in the vocational education context. This seems even more urgent given the role resilience might play in preventing apprentices from dropping out. Therefore, this study presents a conceptualization of apprenticeí resilience in which individual resilience variables are distinguished in capacities, behaviour and belief and context variables. In order to validate this conceptualization, 40 apprentices were interviewed on critical situations and how they would deal with these (series of) situations. Preliminary results seem to verify the conceptualization made of apprentice resilience and hint at the positive role resilience might play in preventing apprentices from dropping out of the vocational training. Although further data need to be conducted, this conceptualization might function as a basic understanding of the complex of apprentice' resilience and might lead to the implementation of resilience trainings in the vocational education context.

A resilience curriculum for early years and elementary schools in Europe (RESCUR)

In-service teacher education,Emotion and cognition,Early childhood education,Primary education

Carmel Cefai, University of Malta, Malta; Katya Galea, University of Malta, Malta;

This paper presents the development of an early years and primary school curriculum for the promotion of resilience in schools in Europe. RESCUR is an EU LLP project aimed at developing a resilience curriculum for early and primary education in Europe through the intercultural and transnational collaboration among the partner institutions. The curriculum is developed on the basis of the current social, economic and technological needs and challenges of the partners involved, and seeks to develop in learners the requisite competences needed to overcome such challenges in their lives to achieve academic success and social and emotional wellbeing as young citizens in the EU. It takes a developmental, inclusive and culturally-responsive perspective, with activities reflecting the diversity of learners, particularly vulnerable children coming from disadvantaged backgrounds. This paper will first define educational resilience in terms of academic, social and emotional growth in the face of life challenges and underline the role of education, particularly resilience education, in fostering learning, growth, and wellbeing. It will then discuss the conceptual framework underpinning the curriculum, defining the key principles on which the curriculum is based. It will also discuss the content areas presented in the curriculum, illustrating how these may be implemented in actual practice by the classroom teacher through multi-level activities.

Building resilience in teacher education: The development of online modules

Pre-service teacher education,Teacher professional development,Higher education,Motivation and emotion

Susan Beltman, Curtin University, Australia; Caroline Mansfield, Murdoch University, Australia; Noelene Weatherby-Fell, University of Wollongong, Australia; Tania Broadley, Curtin University, Australia;

Despite the stated need in the literature for pre-service teachers to develop their capacity for resilience, especially in the early years of the profession, little evidence regarding the content, nature and effectiveness of such interventions is available. This paper reports the initial findings of a funded Australian project developed using a design-based research framework. Extant literature and relevant experts and stakeholders contributed to the design of online modules in their initial development and in staged trials. Quantitative and qualitative feedback from educators and pre-service teachers was extremely positive with specific suggestions regarding usability appearance, and content incorporated into the next iteration of the modules. The online modules are innovative as no resource such as this currently exists. Modules were evidence informed, and then further developed with input from prospective end-users, thus creating links between research, teaching and learning in the higher education sector.

D 14

26 August 2015 08:45 - 10:15

Room Brown_B7

Symposium

Collaborative and cooperative learning

Variations in regulation of cognitive, motivational and socioemotional processes in collaboration

Keywords: Cooperative/collaborative learning,Motivation and emotion,Self-regulation

Sig's: SIG 8 - Motivation and Emotion

Chairperson: Sanna Jarvela, University of Oulu, Finland

Organiser: Sanna Jarvela, University of Oulu, Finland

Organiser: Toni Rogat, Purdue University, United States

Discussant: Simone Volet, Murdoch University, Australia

Even though there is increasing amount of empirical studies reporting about cognitive aspects of collaboration, it is obvious that these learning situations pose not only cognitive challenges for students' engagement, but also socioemotional and motivational challenges For example, challenge may be raised by imbalanced participation and status differences, some members relying on others to do the work, off-task behavior, and pursuit of nonacademic goals The additional effort and necessity of working jointly with others may provoke relevant challenge. Limited research has explored how the motivational and socioemotional climate in the group can contribute to explain regulation quality, with consequences for learning outcomes. Ultimately, more is needed to understand regulation of motivational and socioemotional processes and their

integration to the cognitive aspects of collaboration. The papers in this symposium discuss about quality variation in engagement by considering the group's cognitive, motivational, and socio-emotional processes. The four papers in all will progress the research on collaborative learning, especially paying attention to regulatory processes. Each paper in the symposium (a) identifies cognitive, motivational and/or socioemotional processes in collaboration, (b) presents empirical findings to show how variations in these processes influence collaboration, and (c) identifies and discusses conditions under which successful regulation emerges and can be supported.

Challenges in teamwork: Examining the effects of four different planning scripts

Experimental studies,Mixed-method research,Self-regulation,Higher education,Cooperative/collaborative learning

Allyson Hadwin, University of Victoria, Canada; Elizabeth Webster, University of Victoria, Canada; Aishah Bakhtiar, University of Victoria, Canada; Hannah Caird, University of Victoria, Canada;

This paper examined how anticipated and experienced challenges differ across heavily vs. loosely scripted planning conditions for university students working in teams. Participants were 195 first-year engineering students engaged in a face-to-face team design exercise over 20 minutes. Teams of were assigned to one of two solo planning conditions (scripted vs. control) and one of two group planning conditions (scripted vs. control). Data about challenges were reported individually in a solo planner before the exercise and a solo reflection after the exercise. Across conditions, more challenges were anticipated than were actually reported after the task. Students who completed a loosely scripted solo planner combined with a highly scripted group planner reported encountering the fewest challenges related to planning and teamwork, and had the largest reduction between frequency of expected and reported challenges compared to other conditions. Condition did not significantly affect task performance however there was a trend indicating that both overscripting and underscripting planning may be detrimental for performance.

Emotion regulation in collaborative learning ñ An individual or a group effort?

Experimental studies,Video analysis,Emotion and affect,Self-regulation,Higher education,Cooperative/collaborative learning

Hanna Jarvenoja, University of Oulu, Finland; Sanna Jarvela, University of Oulu, Finland; Jonna Malmberg, University of Oulu, Finland; Jaana Isohatala, University of Oulu, Finland; Marika Koivuniemi, University of Oulu, Finland;

This study focus on emotion regulation during collaborative learning. It targets how the teacher education students activate co- and shared-regulation in socio-emotional interaction. Emotion regulation as a part of regulated learning provides a systematic, active approach to investigate the role of emotions in real learning situations and in groupsí interaction. The specific aim of this study is to explore when and how teacher education students activate individual and socially shared emotion regulation during collaborative learning? The participants of the study were 44

teacher training students participating on a math didactics course. The course was composed of lectures involving small collaborative group tasks and one extensive collaborative course assignment. All together there were eleven groups working together during two months. The collaborative group work was videotaped resulting 88 hours of data. The analysis proceeded by first identifying segments that included socio-emotional interaction. Second, the segments were classified to indicate situations that potentially call for individual and social level emotion regulation. Finally, these segments were analyzed in more details to trace co- and shared-regulation processes and differences between them. The results show that the opportunity to activate emotion regulation was not always realized into action. This is, the students did not activate emotion regulation in every socio-emotional interaction segments that were considered to provide an opportunity for it. Co-regulation was activated more frequently than socially shared emotion regulation. In the presentation the differences between the co- and socially shared regulation will be demonstrated.

The co-regulation of elementary students' motivation and emotion in small group learning

Experimental studies,Mixed-method research,Emotion and affect,Self-regulation,Primary education

Mary McCaslin, University of Arizona, United States; Christine Calderon Vriesema, University of Arizona, United States; Ruby I. Vega, University of Arizona, United States;

This study takes a sociocultural approach in investigating the co-regulation of student motivation and emotion within the context of small learning groups. Participants include third and fifth graders from four classrooms and their teachers. Data sources for these analyses include student self-report measures of their emotion, regulation, and behavior related to classroom learning demands and their "real time" group work experiences. Real -time experiences were captured with two group observation instruments focused on student learning regulation, coping behavior, and group affective climates. Presented analyses will utilize these data sources to explore student mediation of intrapersonal dispositions and interpersonal learning dynamics during group activity. Particular attention will be given to what students bring, both emotionally and motivationally, to their small group activity and how that influences and is influenced by their working and learning with others.

Evolving methodologies analysing the interplay of groupsí regulatory and socioemotional processes

Experimental studies,Video analysis,Emotion and affect,Self-regulation,Secondary education,Cooperative/collaborative learning

Toni Rogat, Purdue University, United States; Karlyn Adams-Wiggins, Rutgers University, United States;

We report on our evolving methodological approaches aimed at capturing the dynamic and interrelated nature of groupís use of (co-)regulatory processes with their socio-emotional interactions (Rogat & Adams-Wiggins, in revision). Three videotaped observations of three

groups of 7th grade students were conducted as they worked in small groups of four during three inquiry-based science tasks aimed to develop scientific reasoning skills. Initial analytic efforts were designed to richly describe how the socioemotional climate differed for groups with varying patterns of other-regulation (i.e., directive versus facilitative other-regulation) (see Rogat & Adams-Wiggins, 2014; Rogat & Linnenbrink-Garcia, 2011 for differentiation of forms of other-regulation). The employed methods resulted in rich description of the socioemotional interactions and afforded between-group comparison, but limited information was available of the interaction among these processes since socioemotional analyses were conducted wholly separate from those for the regulatory processes. Our revised attempts to analyse the interrelationships among these processes required a return to visually representing the co-occurrence of these primary codes, in efforts to highlight the potential overlap (Rogat & Linnenbrink-Garcia, 2013). In particular, we examined whether regulation of the other-regulator preceded, co-occurred, or followed socioemotional codes. We also contrasted the focus of other-regulation related to task activity alongside their purposes during socioemotional interactions. Findings indicated that for both facilitative and directive other-regulators, they maintained efforts to promote or thwart productive socioemotional interactions in ways that aligned with their regulatory priorities. A methodological advance of this research was our examination of the unfolding and developing nature of these co-occurring processes over the course of group activity.

D 15

26 August 2015 08:45 - 10:15

Room Green_A3

Symposium

Cognitive development

Scientific Reasoning in Kindergarten and Elementary School Children

Keywords: Argumentation,Cognitive skills,Developmental processes,Mathematics,Reasoning,Science education

Sig's: SIG 26 - Argumentation, Dialogue and Reasoning

Chairperson: Beate Sodian, Ludwig-Maximilians-Universitat (LMU), Germany

Organiser: Beate Sodian, Ludwig-Maximilians-Universitat (LMU), Germany

Organiser: Kristina Reiss, Technische Universitat Munchen (TUM), Germany

Discussant: Lieven Verschaffel, KU Leuven, Belgium

Hypothesis testing and evidence evaluation skills are of broad importance for learning in school. Recent research has demonstrated basic scientific reasoning skills even in young children. The present symposium addresses the scope and limits of these abilities, with a special focus on the conditions which stimulate and promote early scientific reasoning competencies. Paper 1 shows that while preschoolers' evidence evaluation skills are not supported by collaborative activity, the beneficial effects of collaboration develop rapidly with the onset of formal schooling. Paper 2 finds that young elementary school children's performance in drawing inferences from covariation evidence is affected positively by a continual graphical representation, as compared to a numerical one. Paper 3 demonstrates that third graders' performance in contingency table analysis can be improved by a short-term intervention focussing on proportional reasoning. Paper 4 addresses the complex interrelations between domain-general scientific reasoning skills and domain-specific science learning, and finds that elementary school physics instruction can promote students' experimentation strategies beyond the domain of instruction. Taken together, the present papers strongly support the view that students are ready for learning about hypothesis testing and evidence evaluation in elementary school. The implications of the present findings for instruction will be discussed.

Collaborative evidence evaluation in early school-aged children

Experimental studies,Student learning,Cognitive development,Peer interaction,Reasoning

Andrew Young, UW-Madison, United States; Charles W. Kalish, University of Wisconsin, Madison, United States; Martha Alibali, University of Wisconsin-Madison, United States;

Does collaboration affect how children generate and evaluate evidence? Understanding effects of collaboration on learning is a topic of long-standing interest in the developmental and learning sciences (Bruner, 1961; Piaget, 1926; Vygotsky, 1978). However, relatively little is known about young childrenís evidence generation and evaluation with peers. Here we explore early school-aged childrenís individual and collaborative learning in two domains: inductive causal reasoning and active category learning. In Study 1, kindergartners and first-graders performed a series of fixed interventions on a multi-effect machine in order to learn the causal status of different toy blocks. In a collaborative condition, the child and an adult partner jointly performed causal interventions (i.e., each manipulated one of two toys per test). In an individual condition, the child acted alone. First-gradersí, but not kindergartnersí, causal learning benefitted from collaboration in the absence of active decision making or peer coordination. In Study 2, 5-to-6-year-old and 7-to-8-year-old children played a board game in which they queried a continuous two-dimensional category space in order to learn an unidimensional category boundary. In a collaborative condition, children as dyads jointly selected exemplars. In an individual condition, children completed the search alone. Preliminary results suggest collaborative evidence selection hinders 5- and 6-year-oldsí category learning, but not older childrenís. Taken together, these studies suggest childrenís ability to evaluate evidence generated in collaborative activity seems to rapidly develop in the first years of formal schooling. In addition, children who successfully coordinate collaborative activity seem to demonstrate superior evidence evaluation compared to individuals.

Effects of graphical versus numerical representations on covariation data analysis

Experimental studies,Cognitive development,Comprehension of text and graphics,Developmental processes,Reasoning,Science education

Andrea Saffran, Ludwig-Maximilians-Universitat (LMU), Germany; Petra Barchfeld, University of Munich, Germany; Beate Sodian, Ludwig-Maximilians-Universitat (LMU), Germany;

Covariation judgments are central to data evaluation in scientific reasoning. Little research has systematically addressed intuitive contingency table analysis in elementary school students. The present study investigates the effects of graphical versus numerical data representation on second and fourth gradersí performance in covariation judgments. Previous research in the field of proportional reasoning found facilitating effects of continual stimuli in comparison to discrete ones. The current study compared the effects of continual, discrete and numerical representations on elementary school childrenís interpretation of covariation data presented in 2x2 contingency tables. The sample consisted of n = 73 second graders and n = 64 fourth graders. The continual condition led to better performance than the numerical one, while the discrete condition was of medium difficulty and did not differ significantly from either one of the two other conditions. The facilitating effect of the continual representation was larger for the second graders than for the fourth graders. The findings are consistent with previous research on continual representations in other task contexts and highlight the importance of an adequate visual representation of stimuli, especially in the lower elementary grades. Theoretical and practical implications will be discussed.

Fostering elementary school students abilities in judging the association of two binary variables

Experimental studies,Student learning,Cognitive skills,Reasoning,Mathematics,Science education

Kristina Reiss, Technische Universitat Munchen (TUM), Germany; Matthias Bernhard, TU Munich, Germany;

Judging association between two variables (e.g., the relation between using a fertilizer and plant growth) has always been an important topic in data evaluation and also in psychological research about data evaluation. Studies indicate that already young children have a basic understanding in this domain, but nevertheless apply strategies that are generally invalid and seem to persist until adulthood. The aim of this study was to foster elementary school studentsí strategies when judging association. Therefore, a training program was implemented (N=68; 3rd grade) that focused on two concepts crucial for solving association problems, namely probability and proportion. While both experimental conditions aimed at improving proportional strategies, only students in training group 1 worked on these strategies in a probabilistic context. Children in group 2 worked on proportions in a non-probabilistic context. Children in the control group received regular classroom instruction. The results revealed significant differences in post-test performance between both experimental conditions on the one hand and the control group on the other. Significantly more children in the probabilistic group (62%) than in the non-probabilistic group (29%) or the control group (22%) applied proportional strategies in the post-test. At the

conference, we will present results of this study and discuss implications for classroom instruction.

Physics instruction in elementary school can boost general experimentation skills

Experimental studies,Student learning,Reasoning,Physical Sciences,Science education,Inquiry learning

Elsbeth Stern, ETH Zurich - Research on Learning and Instruction, Switzerland; Peter Edelsbrunner, ETH Zurich, Switzerland; Ralph Schumacher, ETH Zurich, Switzerland; Lennart Schalk, ETH Zurich, Switzerland; Anne Deiglmayr, Swiss Federal Institute of Technology, Zurich, Switzerland;

In a longitudinal study based on an intervention-control design with altogether 383 elementary school children we focus on the relationship between general scientific thinking skills and the acquisition of content-specific concepts in physics. Seven third-grade classes got an intensive inquiry-based instruction on four physics curricula on the topics of floating and sinking, the stability of bridges, sound, and air pressure. Before and after the curricula were applied, a test on experimentation skills was applied. A control group of six classes got the tests only. Two hypotheses were tested: (1) The better a childís experimentation skills are, the more she will gain from the four physics curricula, (2) Experimentation skills increase as a consequence of undergoing the four physics curricula. Hypothesis 1 was only partly confirmed by latent change score models: The pre-test on experimentation skills was only significantly related to the achievement gains of the curriculum on floating and sinking. For Hypothesis 2, latent regression models revealed an effect of the intervention: Having received the four physics curricula accounted for an additional 8% of variance in the posttest on experimentation skills. How this considerable transfer effect from content-specific physics instruction to broader scientific thinking can be further exploited for science learning, will be discussed.

D 16

26 August 2015 08:45 - 10:15

Room Brown_B4

Symposium

Teacher professional development

Combining professional knowledge and professional ethos: VaKE in teacher education

Keywords: Citizenship education,Morality,Pre-service teacher education,Qualitative methods,Teacher professional development,Values education

Sig's: SIG 13 - Moral and Democratic Education

Chairperson: Sieglinde Weyringer, University of Salzburg, Austria

Organiser: Sieglinde Weyringer, University of Salzburg, Austria

Discussant: Brigitte Latzko, University Leipzig, Germany

144 To foster reflective citizenship as a vivid concept of living together, programs of reflective thinking should be introduced more explicitly to the educational system. Teacher education and the anchorage in national curricula provide two possible paths for this promotion. The symposium presents four initiatives and projects from three countries focusing on the development of reflective thinking of teachers at pre-service, in-service and university level based on the concept VaKE (Values and Knowledge Education). VaKE is a constructivist didactical approach combining Blatt and Kohlberg's dilemma discussion approach with inquiry-based teaching; it has been shown repeatedly that with VaKE the students learn at least as much ñ and in many cases much more ñ than control-group students with regular teaching, and on a higher level in Bloom's taxonomy. In the contributions of the symposium VaKE is applied to teacher education. In each of the three national curricula of teacher education a high priority is given to the development of professional knowledge and professional ethos. However, typically reflective thinking on the values orientation of decisions and actions is not nurtured explicitly. The aim is to show that VaKE is one possibility (among others) to address this issue. The first paper presents the principles of VaKE and its adaptation to teacher education; based on this, the other three contributions show how VaKE can increase the professional ethos. Using different methods (quantitative as well as qualitative) the studies show that the intervention produces an effect on reflective thinking.

Values and Knowledge Education in professional educational practice and reflective thinking

Qualitative methods,Pre-service teacher education,Morality,Citizenship education,Higher education,Problem-based learning

Jean-Luc Patry, Universitat Salzburg, Austria; Sieglinde Weyringer, University of Salzburg, Austria;

VaKE (Values and Knowledge Education) is a constructivist teaching method that combines values education through dilemma discussions and knowledge acquisition through inquiry-based learning through dilemma discussions; the moral dilemmas trigger questions about content which then are answered using any source available. Previous research shows VaKE to be effective in schools on all levels (including University). The advantage for teacher education is that in VaKE the link between content (e.g., a professional action repertoire) and values (moral justification of oneís deeds) is established, in contrast to the usual separation of these two issues. The prototypical VaKE procedure consists in eleven steps; for teacher education, it is appropriate to add at least one step (dilemma construction by the student teachers) and to focus the dilemmas on practical problems in teaching with particular reference to the theory-practice relationship. Experiences with teacher trainers in a TEMPUS project and with participants in a University seminar are reported. It turns out that for teacher trainers and teachers it is easy to find practical

situations which can then be used to conceive appropriate VaKE dilemmas; however the discussion of the dilemmas turns out to be much more difficult than anticipated, among others because they are not conscientious of the theories (whether scientific or not) underlying their practical decisions ñ they address the respective questions. Therefore VaKE is a good tool to address this issue of professionalism as well. However, it seems appropriate to add further features dealing with the theory-practice relationship, namely to discuss this relationship itself.

Promoting teacher ethos with VaKE: Experiences of pre-service teachers

Content analysis,Pre-service teacher education,Competencies,Values education,Higher education,Communities of practice

Alfred Weinberger, Padagogische Hochschule der Diozese Linz, Austria; Sieglinde Weyringer, University of Salzburg, Austria;

In the present study pre-service teachers analyse authentic cases according to the VaKE-approach aiming to promote their ethos, which is characterized as moral judgment competence and moral knowledge in order to solve dilemma-situations in the classroom. In a quasi-experimental post-test 14 pre-service teachers, who took part either in a VaKE-setting or in a constructivist knowledge based setting, were interviewed to gain a deeper insight into their experiences and in their reflections on it. The literally transcribed data were content analysed. The results indicate that ethos is learnable through VaKE but the learning outcome depends on necessary conditions: one of these conditions is trust.

Nurturing in-service teachersí reflective thinking on values education using VaKE

Action research,In-service teacher education,Reflection,Values education,Higher education,Communities of learners

Dimitris Pnevmatikos, University of Western Macedonia, Greece; Panagiota Christodoulou, University of Western Macedonia, Greece;

Teachers are expected to be reflective practitioners being able to educate their students on both knowledge and values. Although Greek National Curricula explicitly refer to the integration of values teaching in all school subjects, teachers hardly integrate values reflections related to the provided knowledge. This practice challenges both their professional knowledge and their professional ethos. The aim of the current study was to provide teachers with the necessary professional knowledge to integrate values education in their practice and to examine whether values were addressed in their reflections. Eighty-two teachers were trained in the VaKE approach for implementing this method in their classes. Data were collected through constructive diaries, before, during and after the implementation. The results show that VaKE proves to be effective on students' moral judgements addressing three concurring pairs of values: "welfare versus environment", "friendship versus family" and "wellbeing versus solidarity". The teachers' reflections on the method uncover ten categories showing that the VaKE-method being most popular, and having strong effects on students' motivation and their skills achievement, but not on their role in educating studentsí morality.

Reflections on teaching intercultural issues with VaKE dilemma discussions in higher education

Action research,Synergies between learning, teaching and research,Reflection,Higher education,Multicultural education

Frederique Brossard Borhaug, NLA University College, Norway; Helga Bjorke Harnes, NLA University College, bergen, Norway;

Multiethnic value conflicts are frequently putting at risk the goal of living together more peacefully. In order to strengthen reflective citizenship in multicultural society, it is important to achieve a shared value platform combining equal rights and duties and a broad recognition of cultural diversity. Consequently, better knowledge about complex issues such as equality, cultural difference and equity is required. Nevertheless, knowledge is not enough in order to handle multiethnic value conflicts; reflections on personal values and moral justifications are also a key factor. The research project is a qualitative study on value education in higher education in Norway and it analyses to what extent the VaKE method (Values and Knowledge Education) can be a fruitful didactical approach in teaching intercultural issues. The aim is to develop university teachersí competences in order to nurture studentsí reflections on citizenship in a multicultural society and preventing assimilative and segregating thinking that strengthen collective stereotypes about in-groups/out-groups. The project has an action research and self-study approach: Two university teachers have experienced the VaKE method first as participants and then as facilitators of VaKE in two different student groups. Data consist of two focus group interviews, two semi-structured interviews, and ethnographic observations of the teachersí teaching, along with studentsí written reflections after experiencing VaKE. First results show that the teachers gain an in-depth awareness of their professional ethos and enrichment of their teaching competences.

D 17

26 August 2015 08:45 - 10:15

Room Green_A5

Symposium

Mathematics education

Teachersí knowledge and competence for teaching mathematics: diagnosis, development, and impact

Keywords: Cognitive skills,In-service teacher education,Mathematics

Sig's: SIG 11 - Teaching and Teacher Education

Chairperson: Fien Depaepe, KU Leuven, Belgium

Organiser: Fien Depaepe, KU Leuven, Belgium

Discussant: Henrik Saalbach, University of Leipzig, Germany

Teachers' competence plays a key role in student achievement (Hattie, 2009). A crucial aspect of teachers' competence is their subject-specific professional knowledge ñ entailing both content and pedagogical content knowledge (Kunter et al., 2013). Content knowledge involves conceptual knowledge (i.e., knowledge of concepts, including principles and definitions) as well as procedural knowledge (i.e., knowledge of procedures, including action sequences and algorithms used in problem solving). Pedagogical content knowledge refers to knowledge of the subject matter for the purpose of teaching (Shulman, 1986). The symposium addresses teachers' content knowledge and pedagogical content knowledge in mathematics, and how these types of knowledge relate to teachers' competence to teach mathematics. The objectives of the symposium are threefold. First, it aims at presenting valid instruments to assess teachers' content and pedagogical content knowledge (Depaepe, Lemonidis, Lindmeier, Troebst), as well as methodological sound instruments to capture teachers' subject-specific competence, in a more enacted way and in close relation to real-life teaching demands (Lindmeier). Second, it aims to disentangle the development of teachers' content and pedagogical content knowledge through an ascertaining cross-sectional study of in-service teachers', pre-service teachers', and school students' content and pedagogical content knowledge (Depaepe) as well as through an experimental study on the role of prior professional knowledge for the development of pedagogical content knowledge (Troebst). A third aim is to provide empirical evidence regarding the relationship between distinct components of teachers' content knowledge (i.e., their conceptual and procedural knowledge), and between this knowledge and teachers' reported instructional practices (Lemonidis).

Beyond teacher knowledge: Measuring subject-specific action-related and reflective competences

Quantitative methods,Assessment methods and tools,Competencies,Mathematics,Primary education,Knowledge creation

Anke Lindmeier, Leibniz Institute of Science and Mathematics Education (IPN), Germany; Imke Knievel, IPN Kiel, Germany; Aiso Heinze, Leibniz Institute for Science and Mathematics Education (IPN), Germany;

Subject-specific teacher knowledge was identified as an important aspect for the quality of instruction. However, recent work on teacher cognition shifts the attention on constructs like teachersí professional vision or competences in order to better understand the use of knowledge by teachers. Accordingly, these constructs focus on the ability to apply the knowledge to master the real-life demands of teaching and hence go ìbeyondî formal teacher knowledge. For primary mathematics teachers, we aim at modelling and measuring competences with connection to subject-specific demands emerging (a) during the planning and evaluation of instruction (reflective competences) and (b) during instruction (action-related competences) itself. A third component of subject-specific knowledge subsuming pedagogical content knowledge and content knowledge complements the competences. For the standardized measurement of these

constructs in a feasibility study (N = 85 German primary teachers), we developed partly video-based instruments proximal to real-life teaching situations. The results of a confirmatory factor analysis indicate a better fit for the complex three-factor model distinguishing knowledge and competences components in comparison to a g-model. Therefore, the measures seem to be suited to discriminate between teachers according to their ability to enact their knowledge for teaching. Further studies are needed in order to investigate the predictive qualities of the laboratory measures and make them ready for use in the evaluation of teacher education and further training.

Comparing studentsí, pre-service teachersí and in-service teachersí content knowledge and PCK

Quantitative methods,Teacher professional development,Cognitive skills,Mathematics,Primary education,Knowledge creation

Fien Depaepe, KU Leuven, Belgium; Anneleen Becu, KU Leuven, Belgium; Anne-Sophie Frans, KU Leuven, Belgium; Joke Torbeyns, KU Leuven, Belgium;

A crucial component of teachersí competence is their professional knowledge. Especially, pedagogical content knowledge (PCK) and content knowledge (CK) are important predictors of the quality of instruction and student learning outcomes. It is assumed that experiences as a student, CK training, PCK training, and experiences as a classroom teacher are important sources for the development of this professional knowledge. We document on a study that investigates the PCK (i.e., the knowledge needed to teach particular subject matter) on rational numbers and how it is related to the CK in three different samples, i.e. in-service teachers, pre-service teachers, and 6th grade students. The topic of rational numbers was selected since it is typically a difficult curricular domain and teachers need appropriate CK and PCK to adequately deal with studentsí difficulties. Although it might be contradictory to invest 6th gradersí PCK as it is knowledge which is typically associated with (pre-service) teachers, we explore whether this kind of knowledge is already developed in this target group as a results of their classroom experiences. A test consisting of 48 CK and PCK items on rational numbers was administered to 49 in-service teachers, 74 pre-service teachers, and 134 6th grade students. The results reveal, first, that in-service teachersí PCK is significantly higher than pre-service teachersí PCK. Second, also students have already developed some PCK, although significantly lower than in the other two groups. Third, we found a very strong significantly positive correlation between participantsí CK and PCK.

Development of pedagogical content knowledge: The role of prior professional knowledge

Quantitative methods,Pre-service teacher education,Cognitive development,Mathematics,Higher education,Knowledge creation

Steffen Troebst, Leibniz Institute for Science and Mathematics Education (IPN), Germany; Thilo Kleickmann, Leibniz Institute for Science and Mathematics Education, Germany; Aiso Heinze, Leibniz Institute for Science and Mathematics Education (IPN), Germany; Andrea Bernholt, Leibniz Institute for Science and Mathematics Education (IPN), Germany; Roland Rink,

Humboldt Universitat Berlin, Germany; Mareike Kunter, Goethe-Universitat Frankfurt, Germany;

Pedagogical content knowledge (PCK), that is, knowledge necessary to make subject matter accessible to students constitutes a key component of teacher competence. Hence, the conditions for the acquisition of PCK represent a crucial issue for educational research and practice. With respect to the role of prior content knowledge (CK) and prior pedagogical knowledge (PK) for the acquisition of PCK, we identified three prevalent assumptions: (a) CK and PK amalgamate to form PCK, (b) CK is a necessary prerequisite and facilitates the acquisition of PCK, and (c) CK is sufficient to engender the generation of PCK. We tested these assumptions in a randomized controlled trial with one hundred German pre-service elementary school teachers. They attended intense two-day courses potentially relevant for teaching fractions and fractional arithmetic in sixth-grade mathematics. We manipulated pre-service teachersí prior knowledge by varying course content. For instance, to examine the hypothesis of amalgamation, one group of pre-service teachers received instruction on CK and PK. In line with this, our experimental design featured three experimental groups each embodying one of the three assumptions and two control groups receiving exclusively instruction on either PK or PCK. We assessed pre-service teachersí PCK before, between, and after the two days of the courses. Submitting pre-service teachersí responses to an analysis with an explanatory item response model, we obtained only weak evidence for relevant processes of amalgamation. Moreover, though instruction on both CK and PCK was effective in fostering PCK, we observed no boost in acquisition of PCK due to prior CK.

In-service teachersí number sense content knowledge and teaching practice in rational numbers

Mixed-method research,Teacher professional development,Cognitive skills,Mathematics,Primary education,Knowledge creation

Charalambos Lemonidis , University of Western Macedonia , Greece; Helen Tsakiridou, University of Western Macedonia, Greece; Ioanna Meliopoulou, University of Western Macedonia, Greece;

This study aims at examining teachersí content knowledge in mental calculations of rational numbers (fractions, decimals and percent). Seventy Greek teachers were asked five conceptual knowledge questions and 19 procedural knowledge questions on rational number operations. Besides giving a solution, they were asked to explain their way of thinking, and to mention in every problem all possible strategies they could think of, the latter being an indicator of their flexibility in strategy use. Another set of three open questions interrogated teachers on their teaching practices regarding mental calculations in rational numbers. Teachersí performances on the conceptual and procedural questions are compared with the extent of their strategy repertoire (number of different strategies), as well as with their reported teaching practices in the teaching of mental calculations in rational numbers. Results showed teachersí difficulties in conceptual rational number knowledge as well as a limited repertoire of strategies. Moreover, high performance of mental calculations with rational numbers (procedural knowledge) is positively correlated with the existence of a more extensive repertoire of strategies. Furthermore, teachers

reporting adequate teaching in mental calculations with rational numbers is positively correlated to high procedural knowledge, high conceptual understanding and an extensive repertoire of strategies in mental calculations of rational numbers.

D 18

26 August 2015 08:45 - 10:15

Room Purple_H3 (Rialto)

Symposium

Problem solving and reasoning

(Meta)Cognitive Processes in Learning through Problem Solving

Keywords: Metacognition,Multimedia learning,Problem solving,Science education,Student learning

Sig's: SIG 16 - Metacognition

Chairperson: Saskia Kistner, Goethe-Universitat Frankfurt, Germany

Organiser: Saskia Kistner, Goethe-Universitat Frankfurt, Germany

Organiser: Regina Vollmeyer, Goethe-Universitat, Germany

Discussant: Joachim Wirth, Ruhr-University Bochum, Germany

The question with which strategies or methods students can acquire the most knowledge with computer-based problem solving is addressed by various approaches within educational psychology (e.g., cognitive load theory, dual-space theories). In this symposium we aim to take a look behind the scenes and focus on the cognitive and metacognitive processes that lie between the presentation of a problem and the resulting learning output. These underlying processes (e.g., hypothesis testing, metacognitive judgements) might be affected by various ways of instruction or training and mediate learning outcomes. The studies presented in this symposium used computer-based tasks from various scientific domains to investigate in-depth cognitive and metacognitive processes that take place during problem solving and learning. Raaijmakers et al. trained their students with video-based modelling examples to improve their metacognitive activities (self-assessment and task selection), which then should increase knowledge acquisition when working with biology problems. Leppink et al. focus on students' self-regulatory activities during mathematics and biology tasks, how these are affected by cognitive load, and whether they can be facilitated by metacognitive checklists. Rudolph et al. explore the nature of response confidence in a complex problem solving task and its relations to student characteristics like reasoning and self-concept. Kistner et al. studied under which conditions learners benefit from hypotheses testing in acquiring knowledge with a physics task. The presenters will discuss their

theories and results so as to better understand the (meta)cognitive processes during learning through problem solving and how this learning can be improved.

Metacognitive checklists to facilitate self-regulation skills

Experimental studies,Student learning,Metacognition,Self-regulation,Science education

Jimmie Leppink, Maastricht University, Netherlands; Tamara Van Gog, Utrecht University, Netherlands; Liesbeth Kester, Utrecht University, Netherlands; Jeroen Van Merrienboer, Maastricht University, Netherlands;

Research has provided convincing evidence for scaffolding as an effective means to facilitate learning. Scaffolding is a combination of providing learner guidance and gradually fading that guidance as learner expertise increases. One scaffolding technique that has been proven effective for learning domain-specific skills is the use of metacognitive checklists that comprise guiding questions for learners. Such questions can for instance pertain to mental effort invested in a particular learning activity or to subjective assessment of a particular task performance. From a cognitive load theory and multilevel analysis perspective, this presentation will discuss conditions under which checklists may facilitate the acquisition of self-regulated learning skills, such as monitoring and evaluating their own learning or determining next learning activities.

Explaining response confidence in complex problem solving performance

Quantitative methods,Assessment methods and tools,Metacognition,Problem solving,Self-regulation,Secondary education

Julia Rudolph, University of Luxembourg, Luxembourg; Katarina Krkovic, University of Luxembourg, Luxembourg; Christoph Niepel, University of Luxembourg, Luxembourg; Samuel Greiff, University of Luxembourg, Luxembourg; Frank Goldhammer, German Institute for International Educational Research (DIPF), Centre for International Student Assessment (ZIB), Germany; Stephan Kroener, Erziehungswissenschaftliche Fakultat, Germany;

When are students confident in their achievement? As response confidence (RC) is an important facet of metacognition, the answer to this question is of high relevance for educational success. However, with the exception of Kroner & Bierman (2007) RC has not been linked to self-concept (SC) and so far no research has linked RC and CS with regard to Complex Problem Solving (CPS). Therefore, we aim to replicate and extend Kroner and Biermanns model regarding CPS. This model states that RC reflects self-concept, but only to the extent that students cannot take task inherent cues (TIC) into account. That is, self-concept only predicts RC when the solution cannot be induced from the task itself and additional knowledge is necessary to solve a task. CPS tasks withhold a large number of TICs. Thus, students can verify their mental representation of the correct solution by reevaluating TICs. However, it requires reasoning to utilize these TICs. Therefore, we assume that (1) CPS and RC are related. (2) The relation between CPS and RC is partly explained by self-concept of problem solving. (3) The influence of self-concept on the relation between CPS and RC vanishes, if the model is controlled for reasoning. Using structural equation modelling in Mplus with data from 539

German students in 7th grade (age: M = 13.9; SD = 0.69) all hypotheses were confirmed. The results verify Kroner and Biermanns model in the context of dynamic and interactive tasks and further suggest that studentís utilization of TICs depends on reasoning.

Can metacognitive strategies be improved with video-based modelling examples?

Experimental studies,Teaching/instruction,Metacognition,Problem solving,Self-regulation,Secondary education

Steven Raaijmakers, Utrecht University, Netherlands; Lydia Schaap, Erasmus University Rotterdam, Institute of Psychology, Netherlands; Fred Paas, Erasmus University Rotterdam/University of Wollongong, Netherlands; Jeroen Van Merrienboer, Maastricht University, Netherlands; Tamara Van Gog, Utrecht University, Netherlands;

An effective strategy for students engaging in self-regulated learning in a computer-based learning environment, is to choose tasks adapted to their current level of knowledge. Accurate metacognitive judgments about oneís performance (self-assessment) and about what a suitable next task would be (task-selection) are imperative for such a strategy to be effective. In general, however, studentsí metacognitive judgments are inaccurate. Training consisting of video examples in which human models assessed their own performance and selected new tasks based on a performance/effort algorithm, has been found to improve self-assessment and task-selection judgements and self-regulated learning outcomes. This study aimed to replicate and extend these findings, by including a condition in which task selection was trained by the model applying a more general heuristic The specific algorithm condition (n=29) was hypothesized to show improved task-selection accuracy on problems from the learning environment, while the general heuristic was hypothesized to improve transfer of task-selection accuracy to problems from another domain (n=29). Both experimental conditions also contained self-assessment training and it was hypothesized that this would improve self-assessment accuracy compared to the control condition (n=38). After studying the examples, students engaged in self-regulated learning and completed a posttest. Although effect sizes were in line with the hypothesized effects of algorithmic and heuristic training, analyses showed no significant differences among conditions in self-assessment and task-selection accuracy, or learning outcomes. Potential explanations for the failure to replicate prior findings lie in student motivation and example design; follow-up studies are being conducted to address these explanations.

Learning through hypothesis testing during computer-based problem solving

Experimental studies,Student learning,Problem solving,Science education,Multimedia learning

Saskia Kistner, Goethe-Universitat Frankfurt, Germany; Bruce Burns, University of Sydney, Australia; Regina Vollmeyer, Goethe-Universitat, Germany; Ulrich Kortenkamp, Universitat Potsdam, Germany;

Solving problems in computer-based learning environments usually involves cognitive processes like hypothesis testing and experimenting. In theories of scientific discovery learning these processes are described as search of hypothesis space and search of experiment space. A

common finding is that people who search hypothesis space acquire more knowledge than people who merely focus on experiment space. But does hypothesis testing always result in better learning? The three-space theory of problem solving predicts that this should be true only for people who have an appropriate understanding (model) of the domain which is represented in model space. This study tested this prediction in a 2x2-desing, using a computer simulation on torques. Students were either instructed to test hypotheses or they were induced to search experiment space. They either were supported with a visualization of the torque (good model) or this support was not given (poor model). We found the hypothesized prediction between model quality and search of hypothesis vs. experiment space. Hypothesis testing only resulted in higher knowledge acquisition when a good model was provided. In the experimenting condition, model quality had no impact on learning. These results are in line with the three-space theory. They show that hypothesis testing does not help learning per se and they suggest conditions under which a hypothesis testing strategy is helpful. Here, the understanding of the domain seems to be a crucial factor.

D 19

26 August 2015 08:45 - 10:15

Room Purple_H4

Symposium

Social interaction in L&I

Argumentation for Learning: A Perspective across Domains

Keywords: Argumentation,History,Interdisciplinary,Mathematics,Reasoning,Science education

Sig's: SIG 26 - Argumentation, Dialogue and Reasoning

Chairperson: Jannet van Drie, University of Amsterdam, Netherlands

Organiser: Baruch Schwarz, Hebrew University, Israel

Discussant: Christof Wecker, Ludwig-Maximilians-Universitat (LMU), Germany

The major theories of argumentation conceive of argumentation as a universal discursive technique for arguing about anything with anyone in any situation. But arguing in and about mathematics is different from arguing in history and physics. In the theory of argumentation that considers it to be a form of dialogue (pragma-dialectics), appeal to the psychology of individual participants is explicitly stated to be no concern of argumentation theory: argumentation should only be concerned with commitments of people to statements, on the basis of what they have explicitly said. For the new rhetoric, the relation between argumentation and psychology is limited to the study of the different effects of persuasion of different argumentation schemas. But this ignores the processual aspect of argumentative interaction, the ways in which the

confrontation of arguments and persons leads to co-construction of new forms of understanding, beyond changes of individualsí beliefs. A new theory of learning in and by argumentative dialogue remains to be developed. Such a theory needs to play close attention to the data, i.e. the subtle cognitive, linguistic and interpersonal processes at work in studentsí argumentation dialogues. To lay the foundations for it, the contributors will articulate argumentative practices, and norms in three domains Science, Mathematics and History. They will also exhibit processes of knowledge elaboration with potential for learning. In their presentations, they will inspect extracts from argumentative interactions between students, in different teaching domains. The comparison between the domains will lead to theoretical implications.

Argumentation in science

Argumentation,Reasoning,Science education,Cooperative/collaborative learning

Jonathan Osborne, Stanford University, United States;

Drawing on work conducted by cognitive historians of science and the data we have gathered for our recently completed 4-year project to develop a learning progression for argumentation in science, this presentation will argue that what distinguishes science from other disciplines is not the nature of the argument so much as the knowledge required to engage in scientific argumentation. Science uses three forms of argument and has developed 6 distinct styles of reasoning. Each of these ëstylesí has brought into being a set of entities that are distinct, a body of procedural knowledge necessary to conduct inquiry, and a set of epistemic constructs that justify the claims to know. This analysis suggests that there is no homogeneous universal form of argument that characterizes science. Rather science is distinguished by the entities that are the focus of its interest. Central to the construction of knowledge in science is critique ñ as many of the ideas initially developed are flawed. Data from our research shows critique to be the most difficult aspect of argumentation for students and ways in which such reasoning might be supported will be explored.

Argumentation in mathematical problem-solving

Argumentation,Peer interaction,Reasoning,Mathematics

Nadia Douek, ESPE Universite de Nice, France;

It may seem easy to determine argumentation norms in mathematics if we consider a proof text as a model of argumentation. Norms would concern the organisation of arguments in a deductive logical chain, and validity would be warranted by theorems, backed upon a mathematical theory. However mathematical practice involves more complex forms of argumentation. Some of its characteristics and norms of validity will be put in evidence in problem solving (a typical activity for mathematicians, and hopefully for students) as seen in a widely shared perspective in a western cultural context. A set of theoretical tools will be presented to frame the analysis of argumentation. They allow to bring out arguments of various nature -developed more or less explicitly through problem solving processes- drawing their validity from different references. This variety of arguments and their different limits of validity of these necessary argumentative

practices is an important result. But the theoretical frame also raise the issue of authority: who is to assume ìtheî criteria of validity, in particular when cultural differences may be at stake. Allowing the students to become conscious of these two issues is an important educational issue. Examples of undergraduate students solving a mathematics problem will be analysed to illustrate the first issue and also some consequences of the ability or difficulty to cope with it. And an example from secondary school debate will put in evidence the authority issue more particularly.

Identifying and arguing: The unique relevance of identity to historical reasoning

Emotion and cognition,Peer interaction,History,Cooperative/collaborative learning

Tsafrir Goldberg, University of Haifa, Israel;

Historical reasoning and peer deliberation of historical topics are assumed to be unique in employing a set of historical concepts, practices and norms of proof and evidence. Among these a prominent place is given to issues of perspective, narrative accounts and source evaluation which lead to a focus on context, identity and reliability. However, the reliance on a on a set of domain specific concepts and norms is in fact a commonality of argumentation in the disciplines. A characteristic which may perhaps be more unique to the discipline of history is the strong relation of learnersí identity and ideology to argumentation. These serve as strong motivating forces promoting engagement in argumentation and use of disciplinary practices or concepts. However, identity and ideology may also bias the use of sources, compromise historical reasoning, impeding argumentative dialogue and co-construction of knowledge. Evidence of the complex relations between identity and historical argumentation will be discussed, pointing to their unique and essential role within this type of disciplinary argumentation.

Dialogue, argumentation and education: Constructing democracy in schools

Conversation/ Discourse analysis,Argumentation,Emotion and cognition,Philosophy

Michael Baker, CNRS - Telecom ParisTech, France; Baruch Schwarz, Hebrew University, Israel;

Research on how argumentative dialogue between students can enable them to elaborate knowledge in specific teaching domains has reached a certain state of maturity (e.g. the collective works: Andriessen & Coirier, 1999; Andriessen, Baker & Suthers, 2003; Muller Mirza & Perret-Clermont, 2011). Undoubtedly, this resurgence of interest in dialogue and argumentation as learning processes owes to the rise in the societal importance of collaborative practices. But this research requires further grounding in the history of educational practices, and in theories of dialogue and argumentation, elaborated in connected disciplines in human and social sciences. Our aim in this communication is therefore to situate contemporary research on what might be termed ìcollaborative argumentation-based learningî, ó or even simply ìdialogic learningî (since the primordial form of dialogue is the exercise of reason, argumentation, in exchanged discourse) ó along three dimensions. The first is historical: we retrace the history, in European culture, as well as its cultural-historical origin around the Mediterranean basin, of dialogic practices in education. The second is theoretical: we explore relations between

knowledge elaboration processes in argumentation dialogue and the diversity of theories of argumentation. An example of such an empirical-theoretical link would be that between conceptual change in collaborative argumentation dialogue and argument by dissociation-association. The third dimension is epistemological-didactical, or disciplinary: we consider argumentation processes and types of knowledge elaboration, in relation to learning outcomes, across a broad range of teaching domains (history, geography, biology, physics and mathematics), with the aim of contributing to the elaboration of a theory of learning-in-by-argumentation.

D 20

26 August 2015 08:45 - 10:15

Room Purple_H2

Symposium

Social interaction in L&I

Capturing Instructional Quality from Different Perspectives: Four Analyses of the Same Math Lessons

Keywords: Mathematics,Mixed-method research,Social interaction,Teaching/instruction,Video analysis

Sig's: SIG 10 - Social Interaction in Learning and Instruction

Chairperson: Kurt Reusser, University of Zurich, Switzerland

Organiser: Christine Pauli, University of Fribourg, Switzerland

Organiser: Janneke van de Pol, Utrecht University, Netherlands

Discussant: David Clarke, University of Melbourne, Australia

Preparing students to become responsible and reflective society members is a cardinal aim of education. Hence students are to acquire subject-specific knowledge as well as more general (cognitive, communicative, motivational) competencies and dispositions. Current models of instructional quality take this into account and presume different quality dimensions pertaining to multiple educational goals. It is quite a challenge, however, to make adequate allowance for this complexity when it comes to capturing instructional quality. Here classroom videos provide an effective means. They make analyses of instruction from several perspectives possible, with different theoretical stances, and by employing diverse (quantitative/qualitative) methods. This way they ensure that justice is done to the complexity of teaching and learning processes that pursue multiple educational goals. In our symposium, we demonstrate this potential in four presentations building on the same video data. From a video study on mathematics instruction at

secondary school level, comprising 38 classrooms in Germany and Switzerland, we selected two teaching units (three lessons introducing the Pythagorean Theorem). Several researchers ñ dealing with instruction from various angles, with focus on diverse educational goals, and using different analytical methods ñ were invited to analyze these units. The four contributions of the symposium center on aspects of subject-pedagogy (core content elements; quality of tasks) and of teacher-student interaction (linguistic support; alignment in dyadic interaction). The overall aim of the symposium is to spotlight and discuss the added value of an integration of multiple analyses of instruction both theoretically and methodically.

Quality of mathematics instruction from the perspective of subject pedagogy and learning success

Video analysis,Teaching/instruction,Conceptual change,Mathematics,Secondary education

Christine Pauli, University of Fribourg, Switzerland; Barbara Drollinger-Vetter, Zurich University of Teacher Education, Switzerland; Frank Lipowsky, University of Kassel, Institute of Educational Science, Germany; Eckhard Klieme, German Institute for International Educational Research (DIPF), Germany; Kurt Reusser, University of Zurich, Switzerland;

Current models determine instructional quality mainly by referring to generic quality dimensions. Only little is known, by contrast, about the impact of subject-specific quality dimensions on student learning. Against this background, we investigated the quality of mathematics instruction from the perspective of subject pedagogy and in relation to student learning success. The study included 38 classrooms (about 1000 students), in each of which a three-lesson teaching unit with standardized content (introduction to the Pythagorean Theorem) was videotaped and thereafter analyzed (Klieme et al, 2009). Building on both the current theoretical debate in subject pedagogy and cognitive science, we defined subject-specific instructional quality as encompassing the teacherís addressing, structuring, and connecting of so-called ìcore content elementsî (i.e. distinct components of a mathematical concept which are fundamental to conceptual understanding). On this theoretical basis, we developed an analysis instrument that enabled a quality rating in three dimensions: occurrence of particular core content elements, quality of representations, and structural clarity and coherence of topic development. By means of multilevel analyses we explored the relationship between subject-specific instructional quality and student learning success. The results show that all three quality dimensions predict learning success highly significantly. The two target classes, which served as the starting point for a series of extended analyses from different theoretical and methodological perspectives, scored above average with respect to all quality dimensions. Our analyses indicate that instructional quality as conceptualized in subject pedagogy does not depend on the teachersí methodological arrangement of mathematics lessons.

Does the use of competency-oriented tasks really support students building up competencies?

Video analysis,Teaching/instruction,Competencies,Mathematics,Secondary education

Michael Besser, Leuphana University of Luneburg, Germany; Dominik Leiss, Leuphana University Lueneburg, Germany;

Due to general discussions about competency-oriented learning of mathematics (Bloomhoj & Jensen, 2007) and in line with the implementation of standards for school mathematics in several countries (see e.g. NCTM, 2000) teaching mathematics at school becomes a more and more complex job. Students should not only learn to apply algorithms but they should also acquire additional mathematical competencies such as reasoning, arguing, mathematizing, working on real world problems, devising strategies, using and interpreting representations and communicating about mathematics. By doing so students should develop a ìrelevant system of knowledge and beliefî (Chomsky, 2006) about mathematics for being able to become responsible citizens. Within the research project ìPythagorasî video-taped math lessons have been analysed focusing on central ideas of mathematics didactics: Are there competency-oriented tasks at all? And are these tasks implemented by the teachers in a way which supports students building up mathematical competencies? Results of these analyses point out the existence of tasks covering a broad range of theoretically needed mathematical competencies as well as teachersí difficulties in using these tasks to support students to develop an adequate ìsystem of knowledge and beliefî.

Focusing on language: Teaching practices of academic language support in mathematics lessons

Video analysis,Cultural diversity in school,Teaching/instruction,Social interaction,Mathematics,Secondary education

Sara Furstenau , University of Munster, Germany;

Studentsí success in school is closely linked to the mastering of academic language. In this context, teaching practices which support studentsí acquisition of this capability are important. With the focus on teachersí activities, the paper analyses and compares teaching practices of academic language support and teachersí interactive behaviour in two mathematics lessons filmed during ëThe Pythagoras Studyí (Klieme, Pauli & Reusser 2009) in a German and in a Swiss school. Qualitative, reconstructive methods are engaged, namely interpretive video interaction analyses. Following the concept of macro-scaffolding, the focus will be on lesson phases of joint construction. During these phases, the teachersí and students work on the wording of a mathematical theorem: the theorem of Pythagoras.

Alignment in dyadic face-to-face interaction - Structuring a myriad of concepts

Video analysis,Teaching/instruction,Social interaction,Interdisciplinary

Janneke van de Pol, Utrecht University, Netherlands; Mieke Brekelmans, Utrecht University, Netherlands;

Alignment in dyadic face-to-face interaction has been a focus of study in many different research areas since ancient times. Yet, a myriad of concepts to describe alignment in interaction have been used, such as contingency, synchrony, and complementarity. This is not helpful in our

understanding of and the communication about such concepts. We aimed to determine the core dimensions on which different alignment concepts vary and therewith structure the myriad of concepts that describe alignment in dyadic face-to-face interaction. We reviewed the literature and provided an illustrative case, using data of Klieme, Pauli, and Reusser (2009). We distinguished three core dimensions on which the alignment concepts that we explored differed systematically. First, the component dimension refers to each individualís specific function (e.g., cognitions, emotions, and behaviour) that is the focus of study. Second, the fit type dimension refers to what function values are considered to fit together using sameness fit (i.e., the functions are similar), oppositeness fit (the functions are contrasting), or appropriateness fit (the functions are said to go together but are not similar or opposite). Third, the mechanism dimension describes what type of influence is assumed: (1) unilateral, (2) bilateral, or (3) unilateral-change. We invite researchers from all fields to be explicit about how they define alignment dimensions so we can deepen our understanding of the processes and outcomes of different sorts of alignment together.

D 21

26 August 2015 08:45 - 10:15

Room Brown_B1

Symposium

Teacher professional development

Perspectives on Peer Mentoring as a mediator for reflective pre-service teacher qualification

Keywords: Communities of learners,Cooperative/collaborative learning,Mentoring in teacher education,Pre-service teacher education,Reflection

Sig's: SIG 11 - Teaching and Teacher Education

Chairperson: Stefanie Schnebel, Padagogische Hochschule, Germany

Organiser: Annelies Kreis, University of Teacher Education Thurgau, Switzerland

Organiser: Marieke Thurlings, Eindhoven University of Technology, Netherlands

Discussant: Rosie Le Cornu, University of South Australia, Australia

Reflected practice is a core element of teacher education and professional development. To foster reflection on teaching practice, peer mentoring is a promising environment. In comparison to expert-novice-approaches, peer mentoring is characterised by symmetric relationships, which may result in stronger confidence and more open discussions about concerns. Approaches like Peer Coaching (e.g. Joyce & Showers, 1995) are designed to enrich collaborative reflection

between in-service teachers. The symposium's aim is to demonstrate how peer mentoring and coaching can be effective for student teachers' professional development with studies from four countries. Starting with results from an international literature review on factors and effects of peer coaching between student teachers, the empirical contributions shed light on peer mentoring from three different angles. The Finnish colleagues (2nd contribution) present findings from a qualitative study on peer mentoring for mixed groups of pre-service and newly qualified teachers. The third and fourth contributions are from a Swiss-German study which examines processes and effects of reciprocal peer coaching between student teachers. The 3rd German contribution concerns quantitative findings about student teachers' experiences with collaborative lesson planning and outcomes of the intervention. The 4th Swiss contribution reports findings about the quality of interaction in video recordings of peer coached lesson planning dialogues and effects of the intervention. The symposium sheds light on innovative forms of learning opportunities during pre-service teacher education and on innovative research methodology to explore the processes and effects of peer mentoring. Showers, B., & Joyce, B. (1996). The evolution of peer coaching. Educational Leadership.i>, 53(6), 12ñ16.

A literature review on peer coaching between student teachers: Effects and factors

Meta-analysis,Mentoring in teacher education,Peer interaction,Professions and applied sciences,Higher education,Communities of learners

Marieke Thurlings, Eindhoven University of Technology, Netherlands; Perry den Brok, Eindhoven University of Technology, Netherlands;

A former literature review (Lu, 2010) explored similarities and differences between peer coaching programs for student teachers. The recent literature review aims to update and expand the findings of Luís (2010) review by focusing on the questions: what effects can be achieved through peer coaching between student teachers, and which factors influence the success of peer coaching between teachers. By analyzing and synthesizing 20 publications and 17 data-sets, we reveal that peer coaching has positive effects on student teachersí knowledge, attitudes, teaching, and their pupils. Trust is a prerequisite for the success of peer coaching as well as constructive feedback. The success of peer coaching can be enhanced with video recordings of lessons. Time and support of the environment are also important.

Mingling in Paedeia Cafe: Dispositions of pre-service and beginning teachers in peer group mentoring

Content analysis,Mentoring in teacher education,Reflection,Professions and applied sciences,Higher education,Communities of learners

Ulla Kiviniemi, University of Jyvaskyla, Finland; Hanna Korhonen, Finnish Institute for Educational Research, University of Jyvaskyla , Finland; Hannu Heikkinen, University of Jyvaskyla, Finland; Paivi Tynjala, University of Jyvaskyla, Finland; Kendra Geeraerts, University of Antwerp, Belgium;

In this presentation, we will examine peer-group mentoring between student teachers and newly qualified teachers. The empirical data was collected of Paedeia Cafe peer-mentoring groups, that were introduced by an EU funded Paedeia Project (Pedagogical Action for a European Dimension in Educatorsí Induction Approaches; 2013-16), funded by the Lifelong Learning Program of the European Commission. The aim of the project is to develop new practices for connecting teacher studies and working life. In our presentation, we will study how dispositions of new teachers and student teachers are formed in the peer mentoring groups. By the concept of disposition we mean peopleís cognitive powers, their capacities and their values and commitments, which are expressed in practice. Our data consists of reflective reports of student participants (n = 20), a focus-group interview of mentors (n = 9) and participant observations, which are analyzed through directed content analysis. The results show that mingling pre-service student teachers and newly qualified teachers in peer group mentoring offers new opportunities to build bridges between pre-service and in-service teacher education and to generate worthwhile dispositions through sharing experiences and knowledge about teachersí work.

Student teachersí experiences with collaborative lesson planning - Outcomes of an intervention study

Quantitative methods,Mentoring in teacher education,Attitudes and beliefs,Interdisciplinary,Higher education,Communities of learners

Stefanie Schnebel, Padagogische Hochschule, Germany; Stephanie Musow, University of Education Weingarten, Germany;

Some research and reviews show first findings on the effects of peer coaching for student teachersí professional development. Yet, further evidence is needed to show how individual preconditions and effects on specific peer coaching settings are connected. In the present study, we investigate how an intervention in reciprocal peer coaching affects knowledge, beliefs and attitudes of student teachers regarding lesson planning. For this purpose, data of a questionnaire collected in an experimental pre-post-design are analysed with respect to changes in self-reported lesson planning competencies as well as beliefs and experiences on collaborative lesson planning. The results show differences between the intervention group and the control group especially with regard to experienced quality and the benefits of collaboration. Fewer differences could be found regarding competencies for lesson planning. These first results of the study indicate, that to learn how to adopt reciprocal peer coaching for lesson planning seems to have more impact on aspects of collaboration than on lesson planning competencies.

Qualities of interaction in peer mentoring lesson planning dialogues

Video analysis,Mentoring in teacher education,Peer interaction,Interdisciplinary,Higher education,Communities of learners

Annelies Kreis, University of Teacher Education Thurgau, Switzerland; Sandra Wagner_, Universitiy of teacher education Thurgau, Switzerland;

Supported lesson planning by more experienced teachers is regarded as effective approach to enrich practice-based learning opportunities in teacher education (Kreis & Staub, 2011; Schwille, 2008). Additionally, peer mentoring approaches are promising for the professional development of student teachers (Lu, 2010, Thurlings & den Brok, 2014; see also other contributions of this symposium). However, knowledge about processes of peer mentoring dialogues and about indicators for effectiveness, which go beyond self-reports, is scarce. Consequently, the binational intervention study ìKUBeXî explores the impact of reciprocal peer mentoring on studentsí knowledge and beliefs about and activities in collaborative lesson planning. The intervention is based on an adaptation of Content-Focused Coaching (West & Staub, 2003) as reciprocal peer coaching (Kreis & Staub, 2013). Participants were students of three Swiss and a German teacher education institution who are qualifying as Biology teachers (lower secondary). Lesson planning dialogues of intervention and control groups (Nig = 55; Ncg = 55) were analysed in a video based linguistic discourse analysis for differences with respect to characteristics concerning (a) the genre specific moves of dialogue and (b) the mode of interaction in the planning dialogues. Results suggest that participants of the intervention group elaborated lesson plans more co-constructively than those in the control group. This study provides insight in productive ways of how to foster reciprocal peer coaching with respect to lesson planning.

D 22

26 August 2015 08:45 - 10:15

Room Blue2_D2

Symposium

Teacher professional development

The impact of different models of professional development on teacher learning

Keywords: In-service teacher education,Learning approaches,Pre-service teacher education,Teacher professional development,Video analysis,Workplace learning

Sig's: SIG 14 - Learning and Professional Development

Chairperson: Jan Vermunt, University of Cambridge, United Kingdom

Organiser: Jan Vermunt, University of Cambridge, United Kingdom

Organiser: Maria Vrikki, University of Cambridge, United Kingdom

Discussant: Douwe Beijaard, Eindhoven University of Technology, Netherlands

In teacher professional development programmes numerous pedagogical models are being used. The developers of these programmes almost invariably claim highly effective teacher learning as a result of their interventions. Yet, the pedagogical models underlying the interventions may be

very different, varying from intensive behavioural modelling to teachers conducting research. Often professional development is viewed as more or less the same as teacher learning. The point of departure for this symposium is that what are called professional development models in the literature are pedagogical models, while teacher learning refers to processes and outcomes of human beings. The symposium brings together different types or pedagogical models of professional development and explores their influences on teacher learning. It explores and compares how and what teachers learn under different models of professional development. The presented studies were conducted in four different countries: The Netherlands, Finland, Germany, and the United Kingdom. Moreover, in the various studies different intervention models were used: workplace learning, teacher effectiveness training, learning from texts and lectures, and lesson study. In all studies, evidence for teacher learning processes and outcomes was sought. The symposium will bring together the evidence from these different sources in an attempt to take forward the conceptualization of teacher learning, its measurement and the impact of different forms of professional development on teacher learning.

Student teachersí learning in and from the workplace: A holistic perspective

Content analysis,Qualitative methods,Pre-service teacher education,Teacher professional development,Learning approaches,Workplace learning

Han Leeferink, Radboud University, Graduate School of Education, Netherlands; Maaike Koopman, Eindhoven University of Technology, Netherlands;

This contribution is based on a study into the transformation of student teachersí workplace experiences into learning experiences. Twenty-six stories from 10 student teachers were collected by means of digital logs and in-depth interviews. The data were analysed by using a new technique of reconstruction stories into webs. In these webs, the factors that played a role in student teachers' learning processes, the relationships between these factors, and the chains of student teachersí activities and experiences in their learning processes could be visualized. The results show that student teachersí learning from experiences is a process involving many interrelated personal and social aspects, including past and present experiences gained in multiple situations and contexts over time. Four chains of activities and experiences could be distinguished in their learning processes. The findings indicate that learning in and from the workplace by student teachers must not be perceived as a separate form of student teacher learning, but as an integral part of the wholeness of their learning.

Do teachers benefit from training in social interaction skills?

Quantitative methods,In-service teacher education,Teacher professional development,Attitudes and beliefs,Learning approaches,Social interaction

Markus Talvio, University of Helsinki, Finland; Kirsti Lonka, University of Helsinki, Finland; Taru Lintunen, University of Jyvaskyla, Finland;

While training on teachersí social interaction skills is often recommended, little evidence regarding its benefits exists. In this study, the development of social and emotional learning

(SEL) skills in two groups of teachers (n = 43) were investigated by using the Teacher Effectiveness Training (TET; Gordon, 2003) as an intervention. A comparison group (n = 26) was also involved. The effects of TET intervention were examined from various levels of outcomes of the intervention, including the participantsí reactions, knowledge, knowledge application (skills) and overall well-being. A new measuring instrument, Dealing with Challenging Interaction (DCI) was developed to assess knowledge application. Finally, the sustainability of the studied skills was looked at after nine months of completing the TET. The results showed that the key SEL skills improved in the two intervention groups, but not in the comparison group. Our study added to both the theoretical and practical development of continuing teacher education.

Why some teachers learn more ñ The role of individual resources in professional learning situations

Quantitative methods,In-service teacher education,Pre-service teacher education,Teacher professional development,Emotion and cognition,Learning approaches

Mareike Kunter, Goethe-Universitat Frankfurt, Germany; Anna-Theresia Decker, Goethe-University, Germany; Johanna Seiz, Goethe-University, Institute of Psychology, Germany; Annett Wilde, Goethe-University, Institute of Psychology, Germany; Jasmin Schlax, Goethe-University, Institute of Psychology, Germany;

In our study we investigated whether individual resources of (future) teachers explain why some teachers engage more deeply with learning situations than others. Based on the Cognitive Affective Model of Conceptual Change (CAMCC) of Gregoire (2003) we assume that teachers will invest more in a learning situationói.e., they will process the new information in a systematic, rather than heuristic wayóif they appraise the situation as challenging instead of threatening. According to CAMCC, this appraisal of the learning situation should be influenced by individual resources such as motivation, ability or time. We tested these assumptions in two studies. In study 1, 303 elementary teachers worked in an online-learning setting where they reported on their resources, their appraisal of the situation prior to, and their levels of processing after reading a text. Study 2 investigated 203 teacher students before and after a university lecture. Students reported their resources, appraisal and beliefs before the lecture, and their levels of processing and their beliefs one week after it. For all variables, Likert-type scales were used, and analyses were carried out using structural equation modelling. Across both studies we found confirmation that the teachersí motivational-affective resources influence the appraisal of a situation as either challenging or threatening and that this appraisal leads to different levels of processing and influences learning outcomes. These results should be useful for teacher educators who typically may not be aware that, even within the same learning situation, the experiences of the participating teachers may vary substantially.

How teachers learn through Lesson Study: An analysis of teachersí discussions

Video analysis,In-service teacher education,Teacher professional development,Learning approaches,Mathematics,Workplace learning

Maria Vrikki, University of Cambridge, United Kingdom; Jan Vermunt, University of Cambridge, United Kingdom; Neil Mercer, University of Cambridge, United Kingdom; Paul Warwick, University of Cambridge, United Kingdom;

The aim of this paper is to gain more understanding of how teachers learn in a Lesson Study (LS) environment, thus providing a stronger link between teacher learning theory and the professional development practice of LS. LS is a pedagogical model of teacher professional development that originated bottom-up in Japan. A defining characteristic is a strong focus on analyzing and improving studentsí learning. The model has become increasingly popular and it is used now in many countries outside of Japan as well. In 2013 a project started in which Lesson Study was used as a pedagogical model for professional development for mathematics teachers in the borough of Camden, London. In the first year of the project 25 schools participated, with at least three teachers in each school involved in Lesson Study. The teachersí pre and post lesson discussions were video-recorded, and later on these video-recordings were analyzed. The final version of the analysis protocol has two major sections: Learning Processes and Learning Outcomes. The Learning Processes category is further divided into discourse-related features and content-related features. Large differences were identified between the teacher learning processes of pre and post lesson discussions. The LS pedagogical model seemed to elicit meaning-oriented teachersí learning processes and outcomes, with a strong focus on analyzing, understanding and adjusting the learning processes and outcomes of their pupils. In this way the study contributes to a scarce but emerging field of scientific endeavour focusing on how teacher learning and student learning are, and can be, related.

D 23

26 August 2015 08:45 - 10:15

Room Green_A7

Symposium

Early childhood education

Effects, implementation, and new developments in home-based language and literacy programs

Keywords: At-risk students,Early childhood education,Language (L1/Standard Language),Literacy,Multimedia learning,Parental involvement in learning

Sig's: SIG 5 - Learning and Development in Early Childhood

Chairperson: Roel van Steensel, Erasmus University Rotterdam, Netherlands

Organiser: Roel van Steensel, Erasmus University Rotterdam, Netherlands

Organiser: Rosa Teepe, Radboud University Nijmegen, Netherlands

Discussant: George Manolitsis, University of Crete, Greece

Across Europe, many children from low-SES and immigrant minority backgrounds stay behind in language and literacy development at school. The problems these children encounter are partly related to the ways in which their literacy development is fostered at home. Home-based programs aim to support these childrenís home language and literacy environments by providing stimulating materials, and supporting parents in engaging in stimulating activities and interactions with their children. In this symposium, recent research will be presented that examines three important questions: 1. What are the effects of home-based language and literacy programs on the language and literacy skills of children in disadvantaged contexts? 2. How are such programs implemented and how does variability in implementation relate to program effects? 3. What is the added-value of ICT in promoting the implementation and effects of home-based language and literacy programs? The symposium comprises four contributions. Two contributions present the outcomes of recent literature reviews: De la Rie focuses on the implementation quality of a wide range of programs and examines the association between variability in implementation and program effects, while Neuhauser looks more closely at implementation and effects of one intervention (Parents as Teachers [PAT]). The two other contributions are experimental studies: Schaub discusses the outcomes of a large-scale effect study of PAT, while Teepe focuses on the effects of using ICT to enhance parent-child interaction quality in a home-based program. The contributions are discussed by Jon Carpentieri, family literacy expert at the University of Londonís Institute of Education.

Family literacy programs: What do we know about implementation quality?

At-risk students,Literacy,Parental involvement in learning,Early childhood education,Primary education

Sanneke de la Rie, Hogeschool Rotterdam, Netherlands; Roel van Steensel, Erasmus University Rotterdam, Netherlands; Amos Van Gelderen, University of Amsterdam, Netherlands; Adriaan Hofman, Erasmus University Rotterdam, Netherlands;

Family literacy programs (FLPs) aim to stimulate the home literacy environments of disadvantaged children in order to promote their literacy development. Various meta-analyses have been conducted on the effects of FLPs, but little attention has been given to implementation quality. This review therefore focuses on what is known about the implementation quality of FLPs and its relationship with program effectiveness. We conducted literature searches in PsycINFO, ERIC and LLBA, resulting in 46 relevant studies. Information on implementation quality was coded in terms of ëdeliveryí (transfer of program contents from trainers to parents), ëreceiptí (parent engagement in program activities), and ëenactmentí (transfer of program contents to daily life). Overall, we found quite a lot of information was provided on implementation quality. However, we also found the amount of information depends on the dimension of implementation quality. Almost all studies provided information on receipt, but enactment and, particularly, delivery were addressed much less. Overall, our findings suggest the implementation quality of FLPs is good. We found more frequent use of intervention strategies, higher levels of teacher quality, and larger frequency of targeted parent behaviours in experimental groups, attrition was generally low and the number of program sessions was

reported to be fairly high. Furthermore, parents overall increased their use of the learned techniques during the interventions and engaged in significantly more literacy activities outside program time. However, we also found a number of instances where implementation was less optimal. Our results have implications both for research into and practice of FLPs.

Promoting language development in at-risk families: Links between program implementation and effects

At-risk students,Parental involvement in learning,Language (L1/Standard Language),Early childhood education

Alex Neuhauser, University of Applied Sciences of Special Needs Education, Switzerland;

Various reviews and meta-analyses provide heterogeneous, but predominantly positive assessments of programs for early child care and education (ECCE). Given the heterogeneity, the questions are whether and under what conditions a program exhibits effects in a certain target group. These questions are examined in the present paper by reviewing studies of the program Parents as Teachers (PAT) in at-risk families with a focus on language promoting behavior and language development. Based on five systematically selected studies, the analyses show that PAT has slight and, in isolated cases, substantive effects. Three conditions have a positive impact on the outcomes: (1) Children from multiply stressed families benefit the most in terms of language development, (2) follow-up processes in the form of child-centered measures can reinforce and lengthen the effects, and (3) only implementations in accordance with the programís manual demonstrate effectiveness.

Effects of early support on toddlerís language development: A randomized controlled intervention

Experimental studies,At-risk students,Learning and developmental difficulties,Parental involvement in learning,Language (L1/Standard Language)

Simone Schaub, University of Applied Sciences of Special Needs Education, Switzerland;
Andrea Lanfranchi, University of Applied Sciences of Special Needs Education, Switzerland;

The PISA studies have shown the strong connection between social status and school achievement in many European countries. In order to lessen these differences several programs of early support, beginning at childrenís birth, have been established internationally. The present paper focuses on one major predictor of later school achievement, namely language skills, and examined the effects of early support on language development. Data from the long-term study ZEPPELIN 0-3 (Zurich Equity Prevention Project with Parents Participation and Integration) were used. In this study children from two groups of psychosocially disadvantaged families are followed from childrenís birth to their entry at secondary school. The experimental group is supported via a home-visiting program up to childrenís third birthday, while the control group receives no support. Current data at 24 months confirm previous findings of a positive effect of early support on child development. Children from the experimental group scored higher in the

language subscales of the Bayley Scales of Infant Development III at twelve and at 24 months, and had a larger vocabulary at 24 months.

Effects of ICT-mediated parent-child interaction on vocabulary development of toddlers

Experimental studies,At-risk students,Parental involvement in learning,Language (L1/Standard Language)

Rosa Teepe, Radboud University Nijmegen, Netherlands; Inge Molenaar, Radboud University Nijmegen, Netherlands; Ludo Verhoeven, Radboud Universiteit Nijmegen, Netherlands;

Parent-child interaction is critical for young childrenís vocabulary development. Parents with lower SES backgrounds often experience difficulties in creating challenging and contingent interactions. Empirical research to date has not, however, examined how ICT can be used as a tool to support these parents in creating rich interactions. The purpose of the present study was to examine (1) effects of ICT mediated interaction on preschool childrenís vocabulary development, and (2) the relation between parent-child interaction quality and vocabulary development. A pretest-posttest between-subjects design was used to examine effects of the app Jeffyís Journey (a search-and-find exercise on a tablet computer). Children of the experimental group (n=44) played Jeffyís Journey twice, together with one of their parents. Prior and after, children completed an expressive and receptive vocabulary test. Interactions were transcribed and coded on interaction quality. Control group children (n=27) only performed vocabulary tests. Independent t-tests demonstrated that gains in expressive vocabulary were significantly higher for of the experimental group than for the control group. Gains in receptive vocabulary knowledge did not significantly differ between the two groups. Preliminary analyses on parent-child interaction indicated that abstract language use and contingency were positively related to vocabulary growth.Results indicate that ICT mediated interaction has positive effects on childrenís expressive vocabulary development. Consistent with previous studies, abstract language use and contingency emerged as important for this development. This study shows that an app containing suggestions for questions and promoting contingency between parent and child enhance the childís vocabulary development.

D 24

26 August 2015 08:45 - 10:15

Room Blue1_C1

Symposium

Self-regulation

Pedagogical practices and their relationship to children's development of agency and self-regulation

Keywords: Early childhood education,Metacognition,Primary education,Self-regulation,Video analysis

Sig's: SIG 16 - Metacognition

Chairperson: Nancy Perry, University of British Columbia, Canada

Organiser: Antonia Zachariou, University of Cambridge, United Kingdom

Discussant: Valeska Grau, Pontificia Universidad Catolica de Chile, Chile

The proposed symposium consists of four papers looking at the relationship between pedagogical practices and young children's development of agency and self-regulation. This symposium aims to bring together research conducted in a variety of contexts, including England, Ireland, Chile and Cyprus. The reported studies focused mainly on classroom activities (music, play, literacy amongst others) and employed observational methods to explore and analyse the classroom dynamics that emerged. The first paper explores the influence of pedagogical practices, mainly considering adult involvement, on children's self-regulatory development. This is achieved through focusing on instances of children's (3- to 6-year-olds) social pretend play in Irish early-years classrooms. The second paper compares and contrasts the types of classroom interactions during the transition from preschool to primary school (5-6 years) in a Chilean context; and explores how these affect children's development of a sense of agency. The third paper is concerned with the effect of classroom interactions on the emergence of young children's (6- to 8-year-olds) self-regulation in the context of music classes in Cypriot primary schools. The last paper studies 8-9-year-olds in both Chile and England, and explores links between classroom interactions and self-regulated learning, through the mediation of motivational beliefs and cognitive processes. This symposium aims to discuss the diversity of elements found in classroom interactions across contexts and to suggest possible strategies to facilitate pedagogical practices that will foster agency and self-regulatory development in young children.

Investigating the role of adult involvement in preschool childrenís social pretend play

Teaching/instruction,Developmental processes,Metacognition,Self-regulation,Social aspects of learning,Early childhood education

Lisha O'Sullivan, University of Cambridge, Ireland;

Social pretend play is included in many early childhood education programmes given its potential to support various aspects of development including young childrenís development of self-regulation skills. While adult mediation is considered important in promoting the type of complex or mature social pretence which creates a ëzone of proximal developmentí for the development of metacognitive and self-regulation skills, there is little consensus around what constitutes optimal pedagogical involvement in this type of play. This paper is concerned with the potential contribution of social pretend play to childrenís development as self-regulated learners in the early years and will discuss emerging findings from a PhD study which used observational methods to investigate young childrenís naturally occurring social pretend play in

Irish early years classrooms. Findings emerging from the video analysis will be considered in terms of the influence of adult involvement on the complexity of social pretence and on young childrenís use of self-regulation skills during play. Suggestions are made in terms of teaching strategies which might be especially effective in supporting young childrenís self-regulation in the context of social pretend play.

School transition and changes in pedagogical practices: Impact on childrenís development of agency

Video analysis,Cultural psychology,Teaching/instruction,Self-regulation,Early childhood education,Primary education

Daniela Jadue Roa, University of Chile, Chile;

This paper reports on the outcomes of a PhD study that focused on young childrenís development of a sense of learning agency during their transition between kindergarten and first grade in Chile. The study employed a multiple case study approach selecting two different classroom groups within one school setting. Several video recordings of classroom activities were carried out in kindergarten and first grade. To analyse this data two different observational scales were used: (a) The Observation sheets and proformas of the effective learning programme (Pascal et al., 2001) to identify the type and characteristics of interactions regarding their engaging qualities and the childrenís motivational level; and (b) the ECERS-R (Harms, Clifford, & Cryer, 2005) and SACERS (Harms, Vineberg Jacobs, & Romano White, 1996) scales to evaluate the quality of the environments and the interactions coded. The analysis was carried out using ELAN software to capture the interactions occurring through time, including dialogue, length and simultaneity. Findings revealed that childrenís interventions in classroom interactions are constantly controlled or supressed by adults and this is a progressive factor in the transition to primary school. Furthermore, it shows that adult interventions occur almost for the totality of the minutes video-recorded, meaning that childrenís interventions are always interrupted or ignored. This paper will discuss the influence of these findings on the possibilities offered to children to exercise and develop as learner agents and how this relates to their (positive or not) transition experience.

Exploring the influence of pedagogical practices on self-regulationís emergence during music classes

Case studies,Mixed-method research,Video analysis,Metacognition,Self-regulation,Primary education

Antonia Zachariou, University of Cambridge, United Kingdom;

This paper reports on the influence of pedagogical practices and classroom interactions on the emergence of self-regulation, within musical play tasks. Pedagogical practices and classroom interactions appear to be closely linked to the concept of context. The context, defined as interpersonal relationships, instructional practices and tasks, is currently argued to have an important role in fostering self-regulation (Perry, 2002; Perry& Rahim, 2011). This paper

explores the effect of pedagogical interactions in musical play, a novel, yet arguably promising context for self-regulation (inter alia Trevarthen & Aitken, 2001; Berk, Mann, Ogan, 2006; Bannan & Woodward, 2009; Brinck & Liljenfors, 2013). A mixed-methods study was conducted. Aspects of classroom interactions were observed during musical play sessions implemented in five Cypriot primary schools, focusing on 36 children (6-8-year-olds). Childrenís self-regulation during musical play was coded on the basis of an already-established coding framework. Quantitative and qualitative analysis was conducted. The study reports that the level of teacher involvement significantly influenced the regulatory behaviour, with more self-regulation evident in the teacherís absence. The studyís results also reported that there was a significant main effect of the different source of initiation and leadership of tasks to the regulatory behaviour, with child-initiated play allowing for significantly more self-regulation. Finally, establishing a favourable social context, allowing the children to work in friendship groups and offering them opportunities for peer tutoring also appeared to have beneficial effects on the emergence of self-regulation. This study proposes implications for practice in order to foster childrenís development of self-regulation and learning.

The role of educational processes in self-regulated learning:An exploration through literacy lessons

Cultural psychology,Attitudes and beliefs,Cognitive development,Metacognition,Self-regulation,Social interaction

Pablo Torres, University of Cambridge, Chile;

In the past decades there has been an increasing amount of research into self-regulated learning. This research has focused on how self-regulated learning is linked to thinking, motivation, and learning results as well as how it is fostered in classrooms (Zimmerman & Schunk, 2011). My research expands on the previous studies by adding culture to the equation. It explores the role that different cultures from different countries have on the development of motivations and cognitive processes underlying self-regulated learning. In order to do this, self-regulated learning was studied applying the same methodology and analytical frameworks in two countries, England and Chile, in Literacy lessons. Here, teacher-student and peer to peer classroom talk was studied to access the socio-cultural educational processes relevant to self-regulated learning; Studentsí interviews were carried out to characterise studentsí motivational beliefs such as epistemologies, intelligence theories and goal orientations, and; Studentsí self-regulated learning processes were analysed from studentsí performance in an individual experimental task. The study included 48 eight to nine year old children, half from each country, who belonged to eight different classrooms from different schools in both countries. As data analysis is currently underway, preliminary results show some differences between the two countries. Results about the relation between context and studentsí individual motivational beliefs as well as cognitive process for self-regulated learning will be presented at the conference.

D 25

26 August 2015 08:45 - 10:15

Room Yellow_G3

Symposium

Motivation

The Measurement of Situational Interest: Benefits and Challenges of Micro-Analytical Studies

Keywords: Instructional design,Learning in context,Motivation and emotion,Quantitative methods,Student learning

Sig's: SIG 8 - Motivation and Emotion

Chairperson: Jerome Rotgans , Nanyang Technological University, Singapore

Organiser: Doris Lewalter, Technische Universitat Munchen (TUM), Germany

Organiser: Jerome Rotgans , Nanyang Technological University, Singapore

Discussant: Mary Ainley, University of Melbourne, Australia

The aim of the symposium is to explore and discuss the potential benefits of micro-analytic measures to trace the fluctuation of a persons' situational interest in the course of a learning process and to investigate its antecedents and consequences in more detail than it was possible before. Unlike stable dispositional constructs that can reliably be measured by a single administration of a questionnaire, situational interest has an ephemeral character that requires a different measurement approach. This measurement approach needs to be capable of reliably capturing changes in situational interest during a relatively short period of time. In this symposium, four studies will be presented that applied this methodology to a wide range of contexts (lab experimentation, problem-solving task, classroom practice, online learning), which we argue provides a new operational window of how interest develops and influences learning. Each presenter will highlight how situational interest was operationalized and how these contextually sensitive measures helped advance our understanding of conditions for stimulating situational interest or its impact on learning. The discussant for the session will draw on her large repertoire of work with this methodology to challenge the presenters and promote interaction with the audience regarding the benefits and challenges of micro-analytical studies.

Situational interest and online learning: A closer look

Quantitative methods,Educational technology,Self-regulation,Social sciences,Higher education,Motivation and emotion

Gregor Kennedy, University of Melbourne, Australia; Mary Ainley, University of Melbourne, Australia; Paula de Barba, The University of Melbourne, Australia;

In this research we explore the trajectory of situational interest in an online session involving two learning tasks. In particular we examine how situational interest relates to features of studentsí general motivation and to their confidence about their performance on the learning tasks. Participants were 110 first-year psychology undergraduate students. Findings suggest that differences in trajectories of situational interest across the online learning session were related to self-regulatory learning strategies and to studentsí confidence in their task performance. These findings will be discussed considering the benefits and implications of conducting such a detailed investigation of the learning process, and challenges to micro-analytical measures.

Trajectories of situational interest: Identifying affective engagement ìSignaturesî

Quantitative methods,Student learning,Achievement,Emotion and affect,Self-efficacy,Motivation and emotion

Anna Tapola, University of Helsinki, Finland; Markku Niemivirta, University of Helsinki, Finland;

An increasing number of studies have addressed the dynamics of situational interest and used repeated-measures design to demonstrate its fluctuation during a specific learning episode or task. Although acknowledged, less attention has been paid to the intra- and interindividual differences in the level of and changes in studentsí situational interest. In order to illustrate these differences, and the process-oriented nature of interest, we grouped 5th and 6th grade students (n = 276) based on their successive situational interest measures during a problem-solving task. Three groups with different interest trajectories were identified by using latent class cluster analysis. The groups differed from each other also in terms of their patterns of self-efficacy and affect across the task. We argue that the use of on-task probes, repeated measures design, and information on other simultaneous motivational processes correspond to the current conception of situational interest, and meets well the challenge of measuring transient motivational states. Questions related to the operationalization and measurement of situational interest will be discussed in the light of our results.

The psychological state of interest: Situational or individual interest?

Quantitative methods,Problem solving,Secondary education,Motivation and emotion

Maximilian Knogler, Technische Universitat Munchen (TUM), Germany; Doris Lewalter, Technische Universitat Munchen (TUM), Germany;

The present study applied a micro-analytical measurement approach to investigate whether the measurement of a psychological state of interest is in line with the definition of ësituational interestí provided by the Four-Phase Model of Interest development. Data were obtained from 327 high school students who participated in a problem-based learning project comprising different learning activities. They completed a two-dimensional measure of state interest repeatedly at six critical occasions during the project. Based on three criteria, the results showed that the measured state variable conforms to the definition of situational interest. First, the repeated measures showed moderate to medium longitudinal correlations reflecting rank order

variability across situations. Second, group-means of the repeated measures differed significantly across situations. And third, substantial proportions of variance in the repeated measures were situation-specific and unrelated to preexisting differences in initial individual interest. Theoretically, this confirms the modelís assumption of a state that is closely related to situational circumstances. Methodologically, this is significant as the findings indicate that a micro-analytic measurement approach is able to capture the fleeting and malleable character situational interest. Finally, for educational research this enables a close investigation of specific educational situations and to determine their motivating potential.

How individual interest influences situational interest and classroom learning

Quantitative methods,Student learning,Problem solving,Physical Sciences,Primary education

Jerome Rotgans , Nanyang Technological University, Singapore; Henk Schmidt , Erasmus University Rotterdam, Netherlands;

Not much is known about how individual interest influences situational interest during a learning task and which of the two types of interest is a better predictor of academic achievement. With the current study we addressed this gap in the literature by employing a micro-analytical analysis involving one measure of individual interest, seven repeated measures of situational interest administered during a science task, and one measure of academic achievement at the end of the task. One hundred and eighty six primary school science students in Singapore participated in the study. Data were analyzed by means of structural equation modeling. The results demonstrate that individual interest only had a significant effect on situational interest at the beginning of a learning task; its influence faded away as the task progressed and only situational interest was a significant predictor of learning. Implications of these findings are discussed.

D 26

26 August 2015 08:45 - 10:15

Room Orange_E1

Symposium

Teacher professional development

Cognitive Aspects of Teaching I: Effects of Teacher Expertise on Professional Vision

Keywords: Assessment methods and tools,Culture,Quantitative methods

Sig's: SIG 11 - Teaching and Teacher Education

Chairperson: Andreas Lachner, University of Freiburg, Germany

Organiser: Andreas Lachner, University of Freiburg, Germany

Organiser: Matthias Nuckles, University of Freiburg, Germany

Discussant: Tamara Van Gog, Utrecht University, Netherlands

Recent large scale studies underpin the importance of teacher knowledge for effective teaching (e.g., Baumert et al., 2010; Kunter et al., 2013). They provided important insights into the dimensional structure of teacher knowledge and its impact on student achievement. However, research with regard to the analysis of the underlying cognitive processes that constitute teacher expertise remains scarce. In this double-symposium two important aspects of teacher expertise are investigated: (1) teacher vision (symposium I), and (2) teacher-student discourse (symposium II). Professional vision describes teacher's ability to notice and interpret relevant features of classroom events for students' learning. In this symposium, the role of teacher expertise in professional vision is further scrutinized in four studies. The first contribution focuses pre-service-teachers individual differences of professional vision that can be traced back to the individuals' use of learning opportunities. The second contribution investigates visual and cognitive processes underlying professional vision of experienced teachers in contrast to beginning teachers. The third contribution examines how this professional vision translates to school principals when evaluating teachers. The fourth contribution investigates the impact of expertise and cultural background on gaze patterns in real-life whole-class teaching. The concrete directions that are relevant for educational practice and more specifically for teacher professional development are discussed in this symposium.

Pre-service teachers' profiles in professional vision

Quantitative methods,Video analysis,Pre-service teacher education,Teacher professional development

Kathleen Sturmer, School of Education, Germany; Tina Seidel, Technische Universitat Munchen (TUM), Germany;

Professional vision constitutes an important part of initial teacher education. It describes cognitive processes as the ability to draw on conceptual knowledge about teaching and learning to notice and interpret significant features of classroom situations. Three aspects are distinguished: to describe, explain, and predict classroom situations. In developing those abilities previous research reveals different learning paths in pre-service teachers in the course of their education. In this study, we identify profiles in pre-service teachers in professional vision, measured in a standardized way with the video-based tool Observer. To validate the profiles, we compared studentsí with regard to their individual characteristics such as self-efficacy and investigated whether preservice teachers changed the affiliation to profiles in the course of their university-based teacher education program (3 years). Data of N = 89 pre-service teachers professional vision at four measurement points during their bachelor program were analyzed using latent profile analysis. The results show four profiles that discriminate students with regard to varying performances in professional vision. Additionally, a high amount of preservice teachers developed their professional vision. Furthermore, students with positive changes in

profile affiliation also showed more positive developments in their individual characteristics. This findings support the impact in identifying different learning profiles in pre-service teachers with regard to their professional vision.

Teacher vision: Expert-novice differences in processing problematic classroom management videos

Quantitative methods,Video analysis,Pre-service teacher education,Teacher professional development

Charlotte Wolff, Open University, Netherlands; Halszka Maria Jarodzka, Open University, Netherlands; Niek van den Bogert, Technische Universiteit Eindhoven, Netherlands; Els Boshuizen, Open University, Netherlands;

Teachersí visual perception is an important element of their professional skill set, particularly the ability to simultaneously decipher studentsí attention and understanding while teaching. Simultaneously monitoring and managing the classroom is an ability that develops through experience. Combining eye tracking measurements and think-aloud verbalizations, we investigated differences in how expert and novice teachers perceive and interpret problematic classroom scenes. Sixty-seven Dutch teachers participated: 35 experienced secondary school teachers (experts) and 32 pre-service teachers (novices). Participants viewed videos of real lessons and their eye movements were recorded as they verbalized their thoughts about the lesson. Two types of video fragments were used for this purpose: lessons showing (1) disengaged, inattentive students and (2) a conspicuous disruption in the class. Eye movement analysis showed that novicesí viewing was less focused than expertsí. Experts searched for classroom cues by monitoring students and interactions between students whereas novices searched in a scattered, haphazard way. Experts and novices verbalizations also differed, for example, experts uttered more cognitive and perceptual processing words than novices, suggesting more complex interpretations. Our findings provide further insight into teachersí professional vision, identify useful cues for interpreting classroom interactions, and offer guidelines for training and developing teachersí visual expertise.

How head teachers process visual information: An eye tracking experiment

Experimental studies,Quantitative methods,In-service teacher education,Teacher professional development

Andreas Gegenfurtner, Maastricht University, Netherlands; Tetiana Khmelivska, TU Munchen, Germany; Sarah Ottinger, University of Munich, Germany; Sarah Reinhold, TU Munchen, Germany; Maria Schmidt, HS Fresenius, Germany;

An important task of head teachers and school principals is to evaluate the teaching quality of their staff members. In systematic observations they need to very rapidly notice, interpret, and assess various classroom situations. While the professional vision of pre-service and in-service teachers has already been studied, the visual processes of head teachers and school principals during classroom observations remain uncertain. Grounded in theories of classroom perception

and teacher expertise, the present experiment set out to unveil processes of visual noticing of head teachers and school principals. Participants were 25 head teachers who analyzed classroom situations. Measures included the number of fixations and the fixation duration. The observed classroom situations varied in their interactional complexity (teacher only, student-teacher dyad, small group, whole classroom) and in the duration after stimulus onset (shown for 1 second, 3 seconds, and 5 seconds). The findings signal that head teachers had the highest number of fixations and the longest fixation duration on the areas of interest around the teacher compared with male students, female students, and instructional material. These effects were largely stable across levels of complexity and duration of stimulus presentation. The outcomes of this experiment add to the growing body of evidence examining the perceptual mechanisms of teacher professional vision.

The influence of culture and expertise on teacher gaze patterns

Quantitative methods,Video analysis,Pre-service teacher education,Teacher professional development,Culture

Nora McIntyre, University of York, United Kingdom; Robert Klassen, University of York, United Kingdom;

An important task of head teachers and school principals is to evaluate the teaching quality of their staff members. In systematic observations they need to very rapidly notice, interpret, and assess various classroom situations. While the professional vision of pre-service and in-service teachers has already been studied, the visual processes of head teachers and school principals during classroom observations remain uncertain. Grounded in theories of classroom perception and teacher expertise, the present experiment set out to unveil processes of visual noticing of head teachers and school principals. Participants were 25 head teachers who analyzed classroom situations. Measures included the number of fixations and the fixation duration. The observed classroom situations varied in their interactional complexity (teacher only, student-teacher dyad, small group, whole classroom) and in the duration after stimulus onset (shown for 1 second, 3 seconds, and 5 seconds). The findings signal that head teachers had the highest number of fixations and the longest fixation duration on the areas of interest around the teacher compared with male students, female students, and instructional material. These effects were largely stable across levels of complexity and duration of stimulus presentation. The outcomes of this experiment add to the growing body of evidence examining the perceptual mechanisms of teacher professional vision.

D 27

26 August 2015 08:45 - 10:15

Room Cyan_F2

Symposium

Assessment methods and tools

Innovative measures of metacognition, executive functions and self-regulation in young children

Keywords: Assessment methods and tools,Cognitive development,Developmental processes,Early childhood education,Metacognition,Neuroscience

Sig's: SIG 16 - Metacognition

Chairperson: Deborah Pino-Pasternak, Murdoch University, Australia

Organiser: Loren Marulis, Connecticut College, United States

Organiser: Marisol Basilio, University of Cambridge, United Kingdom

Discussant: David Whitebread, University of Cambridge, United Kingdom

Examining metacognitive, executive functioning, and regulatory (including self- and co-regulatory) processes during infancy and childhood presents multiple methodological challenges. To move the field forward in studying these skills that have been shown to be important to development, learning, and academic achievement (e.g., Dignath, Buettner, & Langfeldt 2008), how they relate to one another, and how they may affect learning, it is essential that researchers focus on ways to measure these early processes in a way that is sensitive to development, ecologically-valid measures, reliable, and valid. The researchers in this symposium will discuss their efforts toward this goal and the measurement issues inherent in studying these processes from infancy to early childhood offering a developmental account: a) The first paper will show innovative ways to measure executive functioning and self-regulation in infants and toddlers; b) The second paper will discuss behavioural and electrophysiological measures of executive functioning and metacognition in 3-6 year olds; c) The third paper adapts previously used measures of individual self-regulation to investigate the ways in which 5-6 year olds co-regulate (influence each others' regulation skills); d) The symposium concludes with a paper presenting an online collaborative database of assessment tools of metacognition, self-regulation, and executive functioning developed to promote interdisciplinary dialogue. Marisol Basilio (previous Metacognition SIG JURE representative) will chair the symposium and Deborah Pino Pasternak will lead the discussion.

New tasks assessing executive function and self-regulation in infants: Validity and performance

Assessment methods and tools,Cognitive development,Metacognition,Self-regulation,Early childhood education

Dave Neale, University of Cambridge, United Kingdom; Marisol Basilio, University of Cambridge, United Kingdom; David Whitebread, University of Cambridge, United Kingdom;

Currently, there are very few tools available to assess executive function (EF) and self-regulation (SR) in children who are 24 months old or below, and this, in turn, limits our understanding of

the early development of these skills. We will discuss the methodological issues in measuring EF and SR in infancy and present three new and adapted tasks for this purpose, along with the final from a longitudinal study with 30+ infants at 12, 18 and 24 months which has resulted in fully specified procedures, coding schemes and validity data (including comparison to previously-used measures such as sub-scales of the Bayley Scales of Infant Development III). Data will be presented about individual differences in infant performance and the validity and applicability of each test at different ages. We have aimed to develop tasks which are more motivating, more ecologically valid and less abstract than previous tasks for this age-range. A brief outline of each task follows. Our proposed tasks use objects infants can understand and readily engage with, in contrast to the more abstract symbolic understanding required in the day-night task and similar tasks for older children.

Metacognition and executive functions in 3-6 year olds: Behavioral and electrophysiological measures

Video analysis,Neuroscience,Cognitive development,Metacognition,Self-regulation,Early childhood education

Loren Marulis, Connecticut College, United States;

The related constructs metacognition (Mc) and executive function (EF) have historically ambiguous roots (Brown, 1987) and have been conceptualized and assessed in various ways (Roebers et al., 2012). Furthermore, there are limited extant measurement tools available to assess these important skills in early childhood. The key aims of this study were to examine multiple tools designed to assess Mc and EF by integrating behavioral and electrophysiological approaches and to examine what these tools would reveal about the emergence of these important learning related skills in preschool-aged children (n=65, 24 girls, ages 4-6, M = 5.30, SD = 0.86). ERP components (the Pe and ERN) were used to assess development at the electrophysiological level, which may occur before changes can be observed at the behavioral level. For example, childrenís limited verbalization skills may mask meaningful growth in Mc that we can only observe at the level of the brain. Integrated with the ERP components were behavioral measures such as a developmentally appropriate and validated metacognitive knowledge interview (asked in relation to a challenging puzzle task children had just completed), a systematic metacognitive behavior. coding scheme that involved indicators of monitoring and control and lack of monitoring and control coded during the challenging puzzle task and several measures of EF including a Go/NoGo task and a measure of attentional control. Data will be presented about feasibility of the tasks as well as individual differences on the tasks.

Measuring kindergartenersí co-regulation using two paired executive function tasks

Cognitive development,Cognitive skills,Metacognition,Self-regulation,Early childhood education

Noah Neidlinger, University of Michigan-Ann Arbor, United States;

Upon entering formal schooling, children bring unique experiences and varying levels of cognitive, social, and emotional skills. These skills, along with environmental factors help determine how well children adjust to new demands of the classroom. To address this, research has examined relations between executive function (EF) skills (e.g., attention, working memory, and inhibitory control) and childrenís academic achievement (e.g., Blair & Razza, 2007). These EF skills have typically been associated with childrenís self-regulation abilities. However, there is far less research investigating how EF skills develop among children within the classroom setting. Thus, a focus on measuring co-regulation, or the ways in which children influence each otherís regulatory abilities in the classroom environment is the next logical step toward understanding childrenís development of regulatory skills. This study used two adapted measures of co-regulation with 150 children (age 65-86 months, 55% male) from eleven kindergarten classrooms in the U.S. We will discuss findings from these paired executive function tasks, implications for using ecologically valid measures of co-regulation in the classroom environment.

New advances of the ëMETAí collaborative catalogue of self-regulation measures for use with children

Cognitive development,Metacognition,Self-regulation,Early childhood education

Marisol Basilio, University of Cambridge, United Kingdom; Loren Marulis, Connecticut College, United States;

Executive functioning (EF), metacognition (Mc) and self-regulation (SR) are related constructs (Roebers et al., 2012). traditionally studied in separate research fields from a range of disciplines: neuroscience, cognitive psychology and educational research. They refer to similar, but theoretically distinguishable set of complex skills displayed in situations that require planning, and on-going monitoring and control of thoughts, emotions, and behaviours. We have previously addressed some of these issues by proposing a collaborative solution among researchers. We have devised a web-based tool intended to help promoting dialogue and knowledge exchange among disciplines in order to move the field forward by (a) creating more unified ways of operationalizing these related constructs when conceptual definitions clearly converge, and (b) creating awareness of the wide range of methods already available to evaluate different aspects of SR skills. We present new advances of our on-going META project. Based on this catalogue, we present an overview of the current state of measurements of SR by analysing tools already catalogued in the META database, which includes all the instruments identified in a recent and comprehensive systematic review of the literature on metacognition (Gascoine, Higgins &Wall, under review).

D 28

26 August 2015 08:45 - 10:15

Room Green_A8

Symposium

Instructional models and strategies

Concept maps as tools for learning and evaluation

Keywords: Achievement,Assessment methods and tools,Cognitive development,Knowledge creation,Learning approaches,Problem solving

Sig's: SIG 14 - Learning and Professional Development

Chairperson: Baerbel Fuerstenau, Dresden University of Technology, Germany

Organiser: Eveline Wuttke, Goethe-Universitat Frankfurt, Germany

Organiser: Baerbel Fuerstenau, Dresden University of Technology, Germany

Discussant: Carmela Aprea, Friedrich-Schiller-University Jena, Germany

Concept maps are networks of terms organized as graphical representations of knowledge (Ca?as et al., 2005). They can be used to support learning processes, e.g. to acquire conceptual knowledge, to foster learners' deep understanding by visualizing complex connections or to support learning in complex learning environments. Moreover, concept maps are helpful to visualize students' learning gains and the changing structure of their knowledge over time. In our symposium we will focus on these issues. The aim of the four papers is to present various possibilities to use concepts maps and to provide evidence on their usefulness. The first paper (Kneppers et al.) investigates whether concept mapping is more effective in promoting student learning than summary writing. The second paper (Riebenbauer et al.) provides insight into ways of working with concept maps and hence derive didactical variations for business classes. The third paper (F?rster-Kuschel et al.) examines whether correcting others' or own erroneous concept maps supports learning of complex business knowledge better. Finally, the fourth paper (Wuttke et al.) aims to depict students' learning processes over time by analyzing changes in their concept maps.

Concept mapping as a learning tool in ill-structured problem solving

Quantitative methods,Student learning,Conceptual change,Citizenship education,Higher education,Knowledge creation

Lenie Kneppers, University of Amsterdam, Netherlands; Baerbel Fuerstenau, Dresden University of Technology, Germany; Rijkje Dekker, University of Amsterdam, Netherlands; Gonny Schellings, Eindhoven University of Technology, Netherlands;

In this study we investigated whether concept mapping or summary writing supports students while learning from authentic ill-structured problems. We interpreted concept mapping and summary writing as elaboration tools that aim to help students to understand new information and integrate it with prior knowledge. We hypothesized that concept mapping is superior to summary writing. This study had two experimental groups: a concept mapping condition and a

summary writing condition. Twenty-six students from the pre-final year of pre-university education participated. These students received scaffolding on problem solving and they worked in pairs. Contrary to our expectations, we did not find significant differences in conceptual knowledge between the experimental groups. However, the concept mapping condition displayed better reasoning. The reasoning was more extensive in the concept mapping condition than in the summary writing condition. Concept mapping seems to better stimulate both pair-arguing and individual reasoning.

Didactical variations of concept maps to foster cognitive and reflective leaning in business class

Comparative studies,Student learning,Reflection,Higher education,Vocational education,Knowledge creation

Elisabeth Riebenbauer, University of Graz, Austria; Peter Slepcevic-Zach, Karl-Franzens-Universitaet Graz, Austria; Michaela Stock, Universitat Graz, Austria;

Business educators face the challenge to arrange and visualize complex business connections to foster the learners/ deep understanding of economic interdependences. Concept maps enable the demonstration of business issues with their underlying structure and important linkages in the form of a network of concepts and links. Concept maps are already used in school classes, university courses and in didactical research. First this presentation aims to introduce different application possibilities of concept maps with didactical variations concerning the level of learner activity, the class arrangement and the physical form. Then the design and results of a survey is presented, examining the question how to support cognitive and reflective learning of business education students with the self construction of concept maps. Based on these results, the potential as well as the limitations of the use of concept maps in special learning and instruction settings is discussed.

Learning from own or each otherís mistakes ñ The use of concept maps in simulation classes

Experimental studies,Student learning,Achievement,Social sciences,Secondary education,Knowledge creation

Baerbel Fuerstenau, Dresden University of Technology, Germany; Jana Forster-Kuschel, TU Dresden, Germany; Jeannine Ryssel, TU Dresden, Germany;

Complex learning environments such as management games are used in instruction to prepare students to deal successfully with workplace challenges and everyday-life situations. In addition, they should support students in their self-development. However, complex learning environments are by no means fast-selling items. Rather, due to their complexity often no definitely true or false answers exist, and errors are often unavoidable. Consequently, the potential of complex learning environments can only be fully exploited in case instructional support is provided, e. g. by using learning strategies such as concept mapping. Concept mapping can be combined with learning from errors by using erroneous concept maps which have to be

corrected by the students. Though research has shown learning from errors to be effective in general, until now only few studies examine whether learning from own erroneous concept maps is superior or inferior to learning from othersí erroneous concept maps. Against this background the study presented here aims at examining whether correcting othersí or correcting own erroneous concept maps supports learning of complex business knowledge better. Based on existing studies the hypothesis was, that learning from othersí erroneous concept maps is superior to learning from own erroneous concept maps. The results support this assumption by trend.

Concept maps as tools for assessing and initiating meaningful learning in higher education

Quantitative methods,Assessment methods and tools,Achievement,Professions and applied sciences,Higher education,Knowledge creation

Eveline Wuttke, Goethe-Universitat Frankfurt, Germany; Franziska Bouley, Goethe Universitat, Germany; Claudia Krille, Goethe-Universitat Frankfurt, Germany;

Often used evaluation methods, such as asking participants about their satisfaction with trainings/interventions or comparing pre- and post-test results, do not reveal any information about the process of knowledge gain or the (individual) structure of the new knowledge. Therefore, there is an increasing interest in using approaches that visualize learnersí gain and structure of knowledge especially to make well-founded statements about learning processes. One approach that fulfills these requirements is concept mapping. Concept maps cannot just be used as an evaluation tool for learning processes but also as a mean to support learnerís assimilation of new information and initiate learning. The presentation aims to depict characteristics of learning processes of students in the course of a university class by analyzing repeatedly enhanced concept maps, as well as to use these results to evaluate the effectiveness of the class and its content.

D 29

26 August 2015 08:45 - 10:15

Room Yellow_G4

Symposium

Attitudes and beliefs

Grade retention beliefs of teachers: A comparative perspective

Keywords: Attitudes and beliefs,Conceptual change,Pre-service teacher education,Teacher professional development

Sig's: SIG 3 - Conceptual Change

Chairperson: Dominique Lafontaine, Universite de Liege, Belgium

Organiser: Gery Marcoux, University of Geneva, Switzerland

Discussant: Marcel Crahay, University of Geneva, France

BORAITAA 14.00 By the way of studies conducted in four different countries with the same questionnaires, we investigated the beliefs of preservice teachers and these ones of in-service teachers concerning grade retention (GR), but also how well they know the researches about the effect of this practice. Then we question the relationship between beliefs and knowledge of researches. We also explore the relationship between teachers' GR beliefs and their psycho-pedagogical beliefs concerning learning, intelligence, pupils assessment, principle of justice. By the comparative perspective adopted, we discus teh extent to which teachers' beliefs concerning GR are culturally grounded.

Grade retention beliefs of pre-service teachers of Geneva, France and French Belgium: What are they?

Quantitative methods,Pre-service teacher education,Attitudes and beliefs,Science education

Gery Marcoux, University of Geneva, Switzerland; Fanny Boraita, Universite de Geneve, Switzerland;

This study aims to explore initial beliefs about grade repetition of 1238 pre-service teachers beginning their initial training in different countries: Switzerland, Belgium and France. These students responded to PTSGRB questionnaire (Pre-service Teachersí Scale about Grade Retentioní Beliefs). It appears that their beliefs are structured into five facets: cognitive and institutional regulation functions of grade repetition, its socio-emotional consequences and its school and maturity causes. Differences appear into their beliefs about these facets in the country. This presentation concludes with a discussion on the fact that these beliefs vary in a certain culture, mainly about academic assessment and grade repetition, anchored within the context in which they begin their training.

Grade retention beliefs of In-service teachers from two countries: French Belgium and Geneva

Quantitative methods,In-service teacher education,Attitudes and beliefs,Science education

Marcel Crahay, University of Geneva, France; Christian Monseur, Universite de Liege, Belgium;

Like many beliefs about education, grade retention (GR) beliefs seem to fit in some sort of personal theory or implicit theory of teaching, learning and development. But which configurations of beliefs give account - at least partially - of decision that a pupil has to repeat a grade? Concretely, our contribution is devoted to the presentation of two studies conducted in the French Speaking Community of Belgium French and in Geneva, both aiming to describe teachersí beliefs in favor of pupilís GR, in conjunction with their psycho-pedagogical beliefs in

(i) learning, (ii) intelligence, (iii-) assessment, and finally (iv) principle of justice. It appears that teachers of both samples have two independent beliefs concerning GR: (1) GR offers a second chance to pupils with learning difficulties (2) GR has negative socio-affective effect. We also observe that the knowledge of research on the effects of repetition influences teachers' beliefs about GR and that psychopedagogical beliefs do not seem to affect teachersí beliefs about student retention. Finally, we discussed our results in light with traditional theories, which assume that beliefs are organized into systems.

Beliefs underlying what Brazilian teachers think of grade retention

Quantitative methods,In-service teacher education,Attitudes and beliefs,Science education

Vanda Mendes Ribeiro, Cenpec, Brazil; Paula Kasmirski, Cenpec, Brazil; Antonio Batista, Cenpec, Brazil; Christian Monseur, Universite de Liege, Belgium; Marcia Jacomini, Universidade Federal de São Paulo, Brazil;

This communication is based on an investigation of the beliefs underlying the positions of Brazilian primary teachers concerning grade repetition (GR). The questionnaire elaborated by Crahay and Marcoux (2009) has been presented in 2014 in a convenience sample of 6,000 Portuguese and multi-subject primary teachers in Brazil. Our main results indicate the presence of a factor, which denotes a strong adherence to GR by teachers in the Brazilian sample; the results also indicate that such adherence is correlated with elitist beliefs and a conception of intelligence as an innate characteristic, but also the belief that repetition is a crucial factor of learning. The study also documents the misunderstanding and ignorance of Brazilian teachers in regards of educational researches concerning the effect of GR.

Grade retention beliefs of pre-service teachers in Romania: What are they?

Quantitative methods,Pre-service teacher education,Attitudes and beliefs,Science education

Daniela Caprioara, University of Constata, Romania;

This study aims to explore initial beliefs about grade repetition of pre-service teachers (PT) beginning their initial training in Romania. The data collection of the research was realized by the application of the questionnaire developed by Crahay and Marcoux (2009) on a sample 37 students of the Faculty of Psychology and Educational Science of the University of Constanta and 33 students of that of Bucharest, at the early beginning of teacher education. The collected responses first underwent explanatory factorial analyses in order to validate a set of constructs and their respective measurement scales. Intern validity of the scale has been evaluated by the Cronbach alpha. These analyses notably distinguished three beliefs about GR: (1) it offers a second chance to students with learning difficulties, (2) it has no negative socio-affective effect, (3) the decision is made on the basis of school marks. The study also documents the misunderstanding and ignorance of Romanian teachers in regards of educational researches concerning the effect of GR. The factor ìknowledge of the researches is negatively correlated to the three beliefs concerning GR. The statistical analysis of the recorded data is in progress,

aiming mainly investigating the relationships of the GR beliefs with the teachersí beliefs concerning learning, intelligence, pupilsí assessment and principles of justice.

D 30

26 August 2015 08:45 - 10:15

Room Yellow_G2

Symposium

Teacher professional development

Professional Development in Dialogic Teaching: Enhancing Teachers' Discourse Practices

Keywords: Argumentation,Conversation/ Discourse analysis,Peer interaction,Reasoning,Social interaction,Teacher professional development

Sig's: SIG 10 - Social Interaction in Learning and Instruction

Chairperson: Ian A.G. Wilkinson, The Ohio State University, United States

Organiser: Ian A.G. Wilkinson, The Ohio State University, United States

Discussant: Janet Gaffney, University of Auckland, New Zealand

Educational researchers, policy-makers, and practitioners increasingly advocate dialogic teaching as a means of furthering students' development. Dialogic teaching is a general pedagogy that capitalizes on the power of talk to foster students' thinking, learning, understanding, and problem solving (Alexander, 2006, 2008). Central to the pedagogy is the teacher's capacity to draw from a repertoire of communicative approaches to further students' development, while privileging the use of discussion and dialogue to promote rational thinking and deep understanding. Despite the advocated benefits of dialogic teaching, available evidence suggests that classroom discourse practices remain largely unaffected by the dialogic zeitgeist and related educational policies. Dialogue-intensive pedagogies impose an additional order of complexity on teaching and learning, and require intensive and sustained professional development to support teachers in their implementation. This symposium examines the professional development efforts of researchers from four different countries to support primary and secondary school teachers' implementation of dialogic teaching. Each paper reflects a systematic empirical investigation of professional development and reports on researchers' successes and struggles in effecting meaningful and positive change in teachers' discourse practices. Our discussant brings expertise in professional development from outside the domain of dialogic teaching to further researchers' thinking in the area. The goal of the symposium is to identify professional development efforts that show most promise for supporting teachers' implementation of dialogic teaching and enhancing their classroom discourse practices. Alexander, R. J. (2006). Towards dialogic

teaching: Rethinking classroom talk (3rd ed.). York, UK: Dialogos. Alexander, R. J. (2008). Essays on pedagogy. New York: Routledge.

Changing teachersí discourse practices: Effects of a video-based intervention study

Conversation/ Discourse analysis,Experimental studies,Video analysis,Teacher professional development,Primary education

Alexander Groeschner, Technische Universitat Munchen (TUM), Germany; Ann-Kathrin Pehmer, Technische Universitat Munchen (TUM), Germany; Tina Seidel, Technische Universitat Munchen (TUM), Germany;

The study investigated whether a year-long video-based teacher professional development program on classroom discourse supports teachers in changing their practice in engaging students verbally, linking student responses to each other, and scaffolding student thinking. As classroom discourse is often dominated by tight interaction pattern (Jurik, Groschner, & Seidel, 2013), research emphasizes the importance of purposeful learning opportunities for students to engage actively in classroom discourse to foster leaning (Mercer & Dawes, 2014). The newly designed Dialogic Video Cycle (DVC) was based on research on effective professional development (Desimone, 2009) with the aim of supporting teachers in changing their discourse practices. Changes in performance of teachers who participated in the DVC (n=6) were compared with those of teachers in a control group (n=4) who participated in a non-video based program without opportunities for reflection on their teaching routines. Videos of both groups (pre-post) were rated based on a high-inference rating scheme (ICCs > .77). In comparison to the control group, results revealed significant changes regarding the intervention teachersí practice to engage students verbally, to link studentsí responses to each other, and to give purposeful feedback. To illustrate findings, the exchanges among teachers in the DVC workshops were videotaped and rated (ICC >. 76) with regard to purposeful classroom discourse activities. These findings showed positive changes in the intervention teachers during the year.

Professional development for dialogic pedagogy: Enhancing teacher judgement

Case studies,Conversation/ Discourse analysis,Teacher professional development,Reasoning,Social interaction,Primary education

Adam Lefstein, Ben-Gurion University of the Negev, Israel; Julia Snell, University of Leeds, United Kingdom;

What professional development practices are most appropriate for supporting teachersí dialogic practice? This paper will shed light on these issues through discussion of a case study of a video-based professional development programme we conducted in one primary school in London. The intervention design was informed by theory and research regarding (a) the nature of teaching practice and the demands that dialogic teaching places on teacher expertise; (b) professional vision, and the potential advantages of joint discussion of video representations of practice for broadening and deepening teacher vision; and (c) sociocultural theories of teacher professional learning, on the job, as a function of their participation in a community of practice. Classroom

practice and the teacher professional development activities were recorded, transcribed, and analysed through linguistic ethnographic micro-analytic methods. The main issues that arise from analysis of this data set include: gaps between the original design and its actual enactment, changes in classroom practice, teacher discourse in the workshops, conflicting views of dialogic pedagogy, representations of practice, and teacher agency.

Evaluation of dialogic teaching in a research-informed teaching intervention

Conversation/ Discourse analysis,Experimental studies,Teacher professional development,Social interaction,Science education,Secondary education

Neil Mercer, University of Cambridge, United Kingdom; Christine Howe, University of Cambridge, United Kingdom;

Drawing on a wide range of school-based research into effective teaching, the epiSTEMe project involved the design, implementation and evaluation of an intervention programme aimed at improving the quality of education in science and mathematics in the first year of secondary school. A distinctive feature of the programme was that teachers who implemented the intervention were asked to adopt a dialogic approach to teaching their subject, and were given initial training sessions about dialogic teaching and techniques aimed to improve the amount and quality of educational dialogue in their classrooms. Controlled comparisons were made to evaluate the programme, involving 26 secondary schools in south-east England. In this paper, we focus on one epiSTEMe module, which was concerned with the teaching of the topic ëForces.í Comparisons between intervention and control schools, and observations of teachers in intervention schools, provided evidence about the value of employing a dialogic pedagogy to teach this topic. We discuss what the project told us about the problematic nature of conducting such research in schools.

Professional development in dialogic teaching to promote studentsí argument literacy

Design based research,Teacher professional development,Argumentation,Literacy,Social interaction,Primary education

Alina Reznitskaya, Montclair State University, United States; Ian A.G. Wilkinson, The Ohio State University, United States; Kathryn Nelson, The Ohio State University, United States; Monica Glina, Montclair State University, United States; Joe Oyler, Montclair State University, United States; Kristin Reninger, Otterbein University, United States;

In this paper, we report findings from a three-year research project designed to help elementary school teachers engage in dialogic teaching. Dialogic teaching is a pedagogical approach that capitalizes on the power of talk to foster studentsí thinking, understanding, and learning. Our research focuses on the use of dialogic teaching to support the development of studentsí argument literacy. Argument literacy is defined as the ability and predisposition to comprehend and formulate arguments through speaking, listening, reading, and writing. The project is being conducted over three years as a design study (Collins, Joseph, & Bielaczyc, 2004). In each year of the project, we collaborated with a new group of teachers to trial and revise the professional

development program in dialogic teaching. Data sources included teacher workshops, study group meetings, focus group interviews, individual coaching sessions, as well as ratings of argumentation and teachersí facilitation of argumentation at the beginning and end of each year. We report findings from three iterations of the program with a description of emerging principles for effective professional development in dialogic teaching.

K1 1

26 August 2015 11:00 - 12:30

Room Mitropoli

Keynote

Social interaction in L&I

To err is human?! Accuracy and Inaccuracy in Teachers' Perceptions of Students

Keywords:

Sig's: SIG 10 - Social Interaction in Learning and Instruction

Chairperson: Tina Seidel, Technische Universitat Munchen (TUM), Germany

To err is human! Accuracy and inaccuracy in teachers' perceptions of students

Experimental studies,Social aspects of learning,Social interaction,Social sciences

Anna Suedkamp, TU Dortmund University, Germany;

Teachersí perceptions of students have a considerable impact on studentsí learning experiences and educational trajectories. Moreover, many instructional decisions are determined by teachersí subjective judgments of their studentsí learning. The ability to accurately gauge the prerequisites and outcomes of student learning is therefore one of the key competencies of teachers. At the beginning of my talk, I will introduce a heuristic model of teacher judgment accuracy, which assumes that teacher judgment accuracy is influenced by teacher and student characteristics on the one hand and test and judgment characteristics on the other hand. Based on this model, I will then present key findings of our meta-analysis on the accuracy of teachersí judgments of studentsí academic achievement and other empirical research in this area. Here, I will distinguish between results from field studies and experimental studies. In field studies, teachersí judgments on studentsí characteristics are compared to studentsí actual characteristics measured by standardized tests. In experimental studies, teachers are asked to evaluate the academic achievement of fictitious students. I will refer to research that uses written vignettes or computer-based approaches to present information about students. In our own empirical research, we used the Simulated Classroom, which is a computer simulation of a classroom situation. Here, factors

which have been shown to impact teachersí judgment in reality can be experimentally manipulated. Finally, I will discuss advantages and disadvantages of the field and experimental approach and discuss practical implications of research on teacher judgment accuracy.

K1 2

26 August 2015 11:00 - 12:30

Room Purple_H3 (Rialto)

Keynote

Collaborative and cooperative learning

Dialogue and knowledge transformation: Towards a socio-cultural theory of cognitive growth

Keywords:

Sig's: SIG 3 - Conceptual Change

Chairperson: Heinz Mandl, Ludwig-Maximilians-Universitat (LMU), Germany

Dialogue and knowledge transformation: Towards a socio-cultural theory of cognitive growth

Argumentation,Cognitive development,Developmental processes,Peer interaction,Reasoning,Social interaction

Christine Howe, University of Cambridge, United Kingdom;

The initial focus of this presentation will be studies of small group dialogue that the presenter has been involved with for over 25 years. These studies examine the effects of dialogue upon individual knowledge when students are assessed several weeks after group activity has terminated. The results provide compelling evidence for the utility of dialogue where students express contrasting ideas about the topics they are studying: this is the message regardless of student age (primary, secondary or tertiary), group size (pairs to groups of five or six), topic of study (science, social science or mathematics), medium of presentation (computer or workbook), and research context (controlled experimentation or authentic classrooms). At the same time, the results also indicate variation over the mechanisms by which contrasting ideas have their effects. Although they sometimes involve little more than the appropriation of group ideas, they frequently depend upon individual reconciliation of ideas in the light of post-group experiences. Such ëdelayed effectsí have important implications for the pacing of teaching and assessment, while also posing challenges for standard socio-cultural models. In recent years, the presenter has been developing and testing an alternative model, and this model together with previously unreported empirical work will be the focus in the second half of the presentation. While the

recent work continues the small group focus, contrasting ideas are also considered in a much broader sense, e.g. clashes between innovative and established approaches to teaching.

K1 3

26 August 2015 11:00 - 12:30

Room Carob Mills

Keynote

Instructional design

Guiding Inquiry Teaching and Learning: Partnerships, Progress, and Prospects

Keywords:

Sig's: SIG 20 - Computer Supported Inquiry Learning

Chairperson: Erik De Corte, University of Leuven, Belgium

Guiding inquiry teaching and learning: Partnerships, progress, and prospects

Educational technology,Instructional design,Computer-assisted learning,Inquiry learning

Marcia Linn, University of California-Berkeley, United States;

To gain insight into how teachers, curricula, and technology can guide students to benefit from inquiry instruction, we have conducted more than 40 comparison studies and four synthesis studies of the literature on inquiry and professional development, visualization, automated guidance, and design of inquiry learning environments. This talk highlights unintended consequences of our designs, collaborations among stakeholders leading to improved guidance, interactions between forms of guidance and prior knowledge, and promising new directions for inquiry investigations.??In our early work we encouraged students to conduct their own explorations using new technologies such as visualizations. Students responded by overwhelming the researchers and the teachers with questions about what to investigate and how to proceed. This unintended consequence motivated us to seek ways to guide students so they could identify their own questions and learn from each other. This research resulted in the knowledge integration framework: a set of design guidelines for focusing student investigations without constraining inquiry. Recently we have explored tools for natural language processing and for analyzing student drawings. We have successes and failures as we seek ways to guide students to revise essays, concept maps, and drawings. I will discuss how we are building on these successes and failures to help students become lifelong learners.

E 1

26 August 2015 13:45 - 15:15

Room Purple_H3 (Rialto)

Paper Presentation

Attitudes and beliefs

Attitudes and beliefs

Keywords: Quantitative methods,Achievement,Attitudes and beliefs,Science education,Secondary education,Pre-service teacher education,Conceptual change,Self-efficacy,Primary education,Student learning,Cognitive skills,Mathematics,Social interaction,Social sciences,Motivation and emotion

Sig's: SIG 1 - Assessment and Evaluation,SIG 11 - Teaching and Teacher Education,SIG 8 - Motivation and Emotion

Chairperson: Emmy de Kraker-Pauw, VU University Amsterdam, Netherlands

Exploring studentsí epistemological belief profiles in science including personality and achievement

Quantitative methods,Achievement,Attitudes and beliefs,Science education,Secondary education

Nele Nicole Kampa, Leibniz Institute for Science and Mathematics Education (IPN), Germany; Irene Neumann, Leibniz Institute fur Science and Mathematics Education, Germany; Kerstin Kremer, RWTH Aachen University, Germany; Patricia Heitmann, Humboldt-Universitat zu Berlin , Germany;

School science instruction and everyday media impart a particular view of science as a discipline, yet not necessarily authentic views. Such views include what people think about how scientific knowledge is built and its characteristics. In psychological literature, these views are subsumed under the construct of epistemological beliefs (EB). EB for the science disciplines typically comprise four aspects: source, development, certainty, and justification of scientific knowledge. Literature on EB provides a remarkable amount of research on for instance its structure but little work has focused on profiles of peopleís EB. We aim to explore particular patterns and thus profiles of EB with a sample of 5,058 German 10th graders. These profiles are then compared regarding motivation, self-concept, socio-economic background as well as science ability and grades. In order to investigate the studentsí profiles we applied Latent Profile Analysis. A 4-class solution containing a (1) sophisticated, (2) slightly naive, (3) evidence-based/static and (4) arbitrary class was chosen as the best fitting solution. The first three student groups show distinctive patterns with respect to motivation and self-concept in science, socio-economic background as well as achievement and grades. The slightly naive and the evidence-based/static group do not differ regarding science abilities and grades. These two groups do not meet goals of educational and curricular standards and should thus be a target for future research.

Further research should also investigate the impact of different EB on science achievement and its covariates in more detail.

Pre-service teachersí belief profiles about teaching and their differences in declared practice

Pre-service teacher education,Attitudes and beliefs,Conceptual change,Self-efficacy,Primary education,Secondary education

Philippe Wanlin, University of Geneva, Switzerland;

Research shows that teachers adopt different profiles regarding constructivist- or transmission-oriented teaching beliefs ranging from student-centered to teacher-centered (Van Driel & Verloop, 2002) sometimes with a profile combining the two teaching approaches (de Vries et al., 2014). These profiles are good predictors of continuing professional development, computer use in the classroom, curricular beliefs, etc. However, there is a lack of research regarding the influence of teacher self-efficacy beliefs on the adoption of these profiles and regarding the differences in teaching practice due to the adoption of one or another belief profile. This research is based on a sample of 228 pre-service teachers graduating for primary and secondary education in Geneva, Switzerland. Data, gathered trough psychometrically reliable and robust paper-pencil questionnaires, relate to teachers beliefs about teaching approaches contrasting student-centered and teacher-centered pedagogical beliefs (e.g. Voss et al., 2011) and their self-efficacy beliefs (Tschannen-Moran & Woolfolk-Hoy, 2001). Two other questionnaires relate to their declared practice about classroom management (Martin & Sass, 2010) and about their management of students heterogeneity (Wanlin, 2015). Data analysis shows that beliefs about teaching approaches deploy in a bi-dimensional space where transmission-oriented and constructivist beliefs coexist. Latent class analysis leads to three teacher profiles: pro-constructivist teachers (LC1, n=73), mid-constructivist neutral transmitters (LC2, n=93) and pro-transmission ñ pro constructivist teachers (LC3, n=62). ANOVA comparisons and Scheffe post-hoc tests show statistical differences between these profiles in self-efficacy beliefs and declared practice. Results are discussed regarding future research and implications for teacher in-service and pre-service professional development and training.

Examining studentsí mathematics attitudes across time: A test of the theory of planned behavior

Quantitative methods,Student learning,Achievement,Attitudes and beliefs,Cognitive skills,Mathematics

Christoph Niepel, University of Luxembourg, Luxembourg; Samuel Greiff, University of Luxembourg, Luxembourg; Franzis Preckel, University of Trier, Germany; Anastasiya Lipnevich, Queens College and the Graduate Center, The City University of New York, United States; Meghan Brenneman, Educational Testing Service, United States; Richard Roberts, Professional Examination Service, United States;

The theory of planned behavior (TPB; Ajzen, 1991) has been proven a useful and theoretically sound framework to examine studentsí attitudes toward mathematics at school. However, any longitudinal studies examining attitudes toward mathematics conceptualized in terms of the TPB are still missing to date. For the first time, the current study examined the longitudinal relation between studentsí mathematics attitudes operationalized in terms of the TPB (i.e., intention, attitude, norm, and control), and mathematics achievement while controlling for studentsí reasoning ability. Participants were 3,357 middle-school students from the USA, who completed measures of each of the key constructs across two time periods. Attitude, norm, and control were found to be conceptually independent. Achievement and mathematics attitudes in terms of the TPB were reciprocally related. Intention predicted changes in studentsí mathematics achievement, indicating incremental predictive validity of mathematics attitudes in terms of the TPB over and above reasoning. In sum, the current study provides first longitudinal support for the validity of mathematics attitudes conceptualized in terms of the TPB.

ëFitting iní: Does it make a difference for teachersí job satisfaction?

Quantitative methods,Attitudes and beliefs,Social interaction,Social sciences,Secondary education,Motivation and emotion

Chloe Meredith, KU Leuven, Belgium; Charlotte Struyve, KU Leuven, Belgium; Sarah Gielen, KU Leuven, Belgium;

For many years, educational research has focused on the job satisfaction of teachers to explain well-being, absenteeism, the decision to leave the profession and most importantly, school quality (Ingersoll & Smith, 2003). In contrary to studies in other organizations, educational research has only paid little attention to the integration or ëfitî of teachers in the school to explain job satisfaction from a contextual perspective. Therefor, this study aims to provide clarity on whether and to what extent the cultural and social-structural fit of teachers in the school team can be associated with their job satisfaction. In order to fully comprehend the relation between fit and job satisfaction, we further investigate whether this relation can be (partly) explained by affective commitment. To answer our research questions, attribute and social network data of approximately 1000 Flemish secondary teachers were gathered. The attribute data concerned teachers' job satisfaction, affective commitment and the fit in the collaborative school culture. Relational data were derived from two sociometric questions concerning the information and the personal guidance network. Based on the regression models, we can conclude that the concept of fit plays an important role in the perceptions and functioning of teachers in their school as both the cultural and social-structural fit matter for teachersí job satisfaction. Further, we found that affective commitment mediates the relation between integration and job satisfaction. These results suggest that the concept of fit plays an important role in the perceptions and functioning of teachers in their school.

E 2

26 August 2015 13:45 - 15:15

Room Green_A2

Paper Presentation

Comprehension of text and graphics

Comprehension of text and graphics

Keywords: Experimental studies,Comprehension of text and graphics,Reading comprehension,Science education,Informal learning,Instructional design,Primary education,Multimedia learning,Student learning,Quantitative methods,E-learning/ Online learning

Sig's: SIG 2 - Comprehension of Text and Graphics,SIG 7 - Learning and Instruction with Computers

Chairperson: Daniel Dinsmore, University of North Florida, United States

ìWhy do they disagree?î Causal explanations improve the understanding of conflicts in multiple texts

Experimental studies,Comprehension of text and graphics,Reading comprehension,Science education,Informal learning

Lisa Scharrer, University of Munster, Germany; Marc Stadtler, University of Muenster, Germany; Rainer Bromme, Universitat Munster, Germany;

In light of the previously attested role that explanations play in readersí revision of their mental models, this study investigated the influence of causal explanations on the understanding of conflicts between multiple documents. Undergraduates read a set of conflicting texts about the topic cholesterol and their subsequent memory and use of conflicting information was assessed. Depending on the experimental condition, the conflicting text claims were either followed by a causal explanation of the underlying mechanisms and by methodological information that suggested an explanation of the conflict occurrence, or they were followed by filler information. We found that readers of conflicts with explanations had a slightly better memory of conflicting information than readers of conflicts without explanations. Moreover, participants who read conflicts with explanations were better able to apply their knowledge of conflicting information in a social knowledge building task. Theoretical and educational implications will be discussed.

Graphicacy in children: An experimental study of the comprehension of paired graphics conventions

Experimental studies,Instructional design,Comprehension of text and graphics,Reading comprehension,Primary education,Multimedia learning

Jean-Michel Boucheix, University of Dijon, LEAD-CNRS, France; Richard Lowe, Curtin University, Australia; Jean-Pierre Thibaut, University of Burgundy, France;

This study investigated the development of the understanding of paired graphics conventions representations commonly used in primary school textbooks (science). An analogy task was used with an experimental material composed of everyday life objects which did not require school prior knowledge. 52 French primary school children, divided in three groups of 5, 6 and 10 years old were presented 45 analogies depicting five common paired graphics convention representations: whole view vs. cross-section; normal view vs. close-up view; realistic vs. abstract; before vs. after; side view vs. top view. An object naming control task of all single pictures was also given to each child. Results showed that (i) widely used conventions are not well known by 5 and 6 year old children (ii) a strong significant increase of the comprehension performance with age. Also, some conventions were understood earlier than others. In primary school classrooms, no explicit systematic teaching of graphical conventions occurs; development of graphical conventions understanding may be acquired through implicit learning. Further, our results seem to show an effect of conceptual development on the understanding of graphics conventions. Easier conventions, conceptually (sharing a great amount of perceptual similarity) were first known, while more difficult conventions, which required more abstract processing, more relations, or spatial relations were acquired later.

Comprehending text-graphic combinations: Text coherence and level of graphical detail

Student learning,Comprehension of text and graphics,Reading comprehension,Primary education,Multimedia learning

Juliette Desiron, University of Geneva, France; Neil Schwartz, California State University, United States; Erica de Vries, Universite Pierre-Mendes-France, France;

Research suggests that text comprehension can be enhanced by providing high coherence texts, as well as by adding graphics. In addition, the integrative model of text and picture comprehension indicates that graphics should be adapted to the aim of the text. In particular, text-graphic correspondence in the level of detail of both text and graphic should be high. The present study investigates the influence of both text coherence and level of detail of a graphic on immediate and delayed comprehension of a science text for young readers. Results showed that (a) immediate text comprehension benefits from a text and a graphic with the same level of detail if text coherence is high, and (b) text comprehension decreases over time regardless of whether there is a graphic or not. Educational implications will be discussed.

The role of processual information in narrations while learning with animations and static pictures

Quantitative methods,Instructional design,Comprehension of text and graphics,E-learning/ Online learning

Ferdinand Stebner, Ruhr-University Bochum, Germany; Tim Kuhl, University of Mannheim, Germany; Joachim Wirth, Ruhr-University Bochum, Germany; Paul Ayres, University of New South Wales, Australia;

The present paper aims to investigate the role of processual information in annotating narrations while learning with animations and static pictures. Previous research indicates benefits of animations over static pictures, especially when processes are to be learned. One could assume that narrations and in particular the amount of processual information that is verbally explained ñ e.g. explained spatial and temporal changes ñ might have a different effect on learning with whether animations or static pictures. In two experiments, seventh and eighth graders from German high schools were randomly assigned to different learning environments which differed in the combination of visualization (no visualization vs. static visualization vs. animation) and type of narration (no narration, static-description narration, process-description narration). Students learned the chemical processes of washing laundry with a computer based learning environment. Results revealed that the multimedia principle was met for this kind of instructional material. Moreover, results show consistently a significant superiority of animations over static pictures. Concerning narrations, results are inconclusive and only showing a significant superiority of process-description in Experiment 2 (but descriptively also in Experiment 1). Contrary to the assumptions, the interaction of specific information in narrations and visualizations was not significant. The fact that the instructional material was ecological valid and suited to use in schools might have overshadowed this rather subtle effect and might be a reason to use instructional material that is more tailored for this kind of research question in future research.

E 3

26 August 2015 13:45 - 15:15

Room Green_A1

Paper Presentation

Culture and education

Culture and education

Keywords: Quantitative methods,Cultural diversity in school,Cognitive skills,Competencies,Social development,Primary education,Case studies,Cultural psychology,Culture,Mathematics,Communities of practice,Qualitative methods,Social interaction,Language (Foreign and second),Ethnography,At-risk students

Sig's: SIG 21 - Learning and Teaching in Culturally Diverse Settings

Chairperson: Vera Busse, Carl von Ossietzky Universitat Oldenburg, Germany

Effect of school ethnic diversity on educational outcomes and functioning for bi-ethnic children

Quantitative methods,Cultural diversity in school,Cognitive skills,Competencies,Social development,Primary education

Merlijn Karssen, Kohnstamm Institute, University of Amsterdam , Netherlands; Ineke van der Veen, Kohnstamm Institute, University of Amsterdam, Netherlands; Monique Volman, University of Amsterdam, Netherlands;

In this study we have examined whether the effect of school ethnic diversity on the school outcomes and school functioning of bi-ethnic students is different from the effect on mono-ethnic students in the Netherlands. Furthermore, this study examined whether the effect of school ethnic diversity on the school outcomes and school functioning of bi-ethnic students varies by the ethnic background and gender of the migrant parent and socio-economic status (SES). It was found that whereas school ethnic diversity had no effect on the school outcomes and school functioning of bi-ethnic and mono-ethnic minority students, mono-ethnic majority studentsí school outcomes and school functioning were affected by school ethnic diversity. The ethnic background and gender of the migrant parent and SES did not influence the school outcomes and school functioning of bi-ethnic students. This study indicates that the outcomes and functioning of bi-ethnic students are not influenced by interacting in an ethnically diverse school.

Teacher's use of past experiences to make sense of children's mathematical learning

Case studies,Cultural psychology,Culture,Mathematics,Primary education,Communities of practice

Sarah Crafter , University College London, Institute of Education, United Kingdom; Guida de Abreu, Oxford Brookes University, United Kingdom;

Research that has focused on the role of teachers in mathematics learning has tended to examine beliefs (e.g. Beswick, 2007), teachers perspectives on pedagogy and practice (Escudero & Sanchez, 2007) and studies on classroom interactions between teachers and pupils (Gorgorio, Planas & Vilella, 2002). This paper will build on an under-researched area of teachers/personal event histories and the way in which their own educational experiences of the past help construct the teacher of the present. Following a sociocultural approach, teachersí past experiences are examined using the notion of heterochronicity, which looks at the partially overlapping histories of the individual and society (Beach, 1999; O/Toole & Abreu, 2005). The analysis draws on case study interviews that explored four (one male and three female) ethnic minority teachers' (i) experiences of their own mathematical learning both at school and at home, (ii) how they perceived these experiences as impacting on their pupils learning. The data analysis took a top-down approach by looking for intersections between past and present in the data and then applying a secondary layer of analysis by looking at the role of community, the self and the role of family. Teachers negotiated a complex relationship between ëteacherí and ëmember of the communityí, the self as a ëminority childí and the now ëadult teacherí, and their own childhood parental relationships in relation to the parents of the children they teach.

Examining three interdependent transitional processes involved in child language brokering in school

Qualitative methods,Cultural diversity in school,Culture,Social interaction,Language (Foreign and second),Communities of practice

Sarah Crafter , University College London, Institute of Education, United Kingdom; Tony Cline, University College London, United Kingdom; Evangelia Prokopiou, University of Northampton, United Kingdom;

When families migrate to a new country their children often learn the local language faster than their parents and become translators or interpreters for their family. They may do more than literal word-for-word translation and also act as cultural and linguistic mediators between their families and professionals, like teachers, and as such, can be termed child language brokers (CLBs). This paper draws on the qualitative data from a wider study that looked at teachersí and young adult CLBsí experiences of child language brokering in school. Reported here is the data from in-depth narrative-episodic interviews with the 14 young adults who had brokered at school (4 of whom were male). The young people were aged between 16 and 26 years old and had arrived in the UK any time between the ages of 5 to 14 years. The theoretical concept of transition as three interdependent processes is used as a framework for analysing the data (Zittoun, 2008), i.e. (i) identity processes, (ii) knowledge acquisition and (iii) sense-making. Our theoretical coding (Flick, 1998) will address the CLBsí identities in terms of ëbelongingí and ënot belongingí through the positions they took in relation to teachers, the school context, parents and peers. Our analysis of the process of knowledge acquisition will focus on the qualities described by the CLBs as characterising an effective broker. How the child feels about acting as a CLB and the impact it had on their school life will provide the mechanism to study sense-making.

Social reevaluation in a collective multi-cultural religious society: A case study of detached youth

Case studies,Ethnography,Cultural psychology,At-risk students,Culture

Anat Kali, Efrata College of Education, Israel; Deborah Court, The Pinchas Churgin School of Education, Israel; Shlomo Romi, Bar Ilan University, Israel;

Ultra-Orthodox (Haredi) society is a collective, multicultural society, by self-definition closed off to modernity. Haredi detached adolescents experience guilt, rejection, and severance from the community, and at times even from their families. This multiple case study was designed to conceptualize the way these adolescents experience their society and to identify reciprocal social mechanisms between them and their community. Research tools: Interviews and observations. Study sample: 67 interviewees ñ 44 adolescents at risk (27 boys, 17 girls), 5 parents, 10 rabbis and ìbrokersî who work with adolescents at risk, and 8 social workers. Eleven observations were held in the adolescentsí various meeting places. Data analysis: Based on grounded-theory methods and ethnographic content analysis. Findings: Social reevaluation was found to operate when individuals or families attempt to move between social fields and when a change exposes a mental, physical, or educational problem. In both cases, society re-assesses the individual or family following events that entail ìsocial paymentsî such as exclusion, concealment, etc. As a mechanism, social reevaluation leads adolescents down the road to double marginality protects collective interests, and harms individuals.

26 August 2015 13:45 - 15:15

Room Green_A3

Paper Presentation

Culture and education

Culture and education

Keywords: Quantitative methods,Assessment methods and tools,Cognitive development,History,Primary education,Ethnography,Qualitative methods,Culture,Developmental processes,Case studies,Cultural diversity in school,Reflection,Out-of-school learning,Learning in context,Action research,Higher education,Problem-based learning

Sig's: SIG 21 - Learning and Teaching in Culturally Diverse Settings,SIG 3 - Conceptual Change

Chairperson: Yotam Hod, University of Haifa, Israel

Along which levels do primary pupils develop their understanding of historical time?

Quantitative methods,Assessment methods and tools,Cognitive development,History,Primary education

Marjan de Groot-Reuvekamp, Fontys University of Applied Sciences, Netherlands; Anje Ros, Fontys Hogescholen, Netherlands; Carla Van Boxtel, University of Amsterdam, Netherlands; Frans Oort, University of Amsterdam, Netherlands;

This study focuses on the development of the understanding of historical time of pupils in primary school. We present a model with three different levels: emergent, initial and continued understanding of historical time. Based on this model we constructed an instrument to measure on which levels pupils aged six to twelve perform. Participants were 1457 pupils from seven primary schools. The analysis of the data showed that on all three levels pupils in higher grades significantly outperformed pupils in lower grades and that pupilsí performances were influenced by variables like gender, reading levels and parentsí education. In all grades there seemed to be room for improvement. Future research could investigate the contribution of targeted education to pupilsí performances on the understanding of historical time. The results of this study show that the presented model is useful to define along which levels primary pupils develop their understanding of historical time.

Examining cultural and developmental differences in elementary studentsí personal epistemology

Ethnography,Qualitative methods,Culture,Developmental processes,Primary education

Florian Feucht, The University of Toledo, United States; Regina Rotshtein, University of Toledo, United States; Andres Acher, Universitaet Halle, Germany;

Personal epistemology, which refers to individualsí beliefs about knowledge, is an important component for promoting deeper learning and engagement and higher-level critical thinking. To examine developmental and cultural influences on personal epistemology, 80 fourth-grade and sixth-grade students in the United States and Argentina were asked to list items that looked like knowledge to them and provide a rationale for why they thought the item looked like knowledge. The majority of students described knowledge as something gained from external sources, but some sixth-grade students held a more sophisticated belief of themselves as active constructors of knowledge. Cultural comparisons showed that students in the United States were more likely than Argentinian students to describe knowledge as relating to intelligence.

Stimulating critical reflection on sensitive heritage in urban classrooms during museum visits

Case studies,Cultural diversity in school,Reflection,History,Out-of-school learning,Learning in context

Geerte Savenije, University of Amsterdam, Netherlands; Carla Van Boxtel, University of Amsterdam, Netherlands;

This paper aims to explore pupilsí attribution of significance to sensitive heritage during educational projects including museum visits. We conducted a multiple case-study with urban classrooms in secondary education in the Netherlands that participated in a project about the history of slavery and a project about WWII. Data sources are questionnaires, interviews and observations. The results indicated that the presentation of the historical traces as Dutch heritage stimulated the pupilsí personal engagement and reflection on their attribution of significance. The pupilsí understanding of the ways in which the histories are attributed significance in current Dutch society increased. However, neither of the museums discussed the possibility to not attribute significance to the particular history. The study also revealed the dynamic of the interplay between understandings of significance and identity. The pupilsí ability to critically reflect on this interplay and on the question of what constitutes good criteria for the attribution of significance differed between the cases. The study illuminates tensions in educational settings between present-oriented and detached approaches of the past, related to debates about critical thinking skills and historical reasoning. Insights from this study can inform pedagogies of history teachers and museum educators.

National and individual cultural values as antecedents of international studentsí adaptation

Action research,Cultural diversity in school,Culture,Higher education,Problem-based learning

Dirk Tempelaar, Maastricht University , Netherlands; Nel Verhoeven, HZ University of Applied Sciences, Netherlands;

Studies into the transition of international students generally focus on experiences of sojourners. The adaptation process that international full degree students need to undergo is even more challenging than that of sojourners. These students move at very young age, immediately after graduating high school, to a new country, practicing new languages, learning within new educational systems, amongst a group of home students for whom transition to university counts many less obstacles. In this empirical study, we will investigate this adaptation process of international full degree students. We will do so within two complementary frameworks: that of national and individual cultural factors. The cultural framework we opt for encompasses the Hofstedeís model of national dimensions of cultural differences, and the Cultural Dimension of Learning Framework by Parrish & Linder-VanBerschot, based on individual dimensions of cultural variability. We investigate how cultural factors impact the affective, behavioural and cognitive facets, and how these variables in turn impact successful adaptation. This empirical study is rooted in a large introductory module mathematics and statistics, based on the principles of blended learning, combining face-to-face problem-based learning sessions with technology enhanced education. Data is used from the most recent year classes of freshmen entering this course, 2013/2014, in total 937 students, with a share of 70% international students.

E 5

26 August 2015 13:45 - 15:15

Room Brown_B1

Paper Presentation

Educational policy

Educational policy

Keywords: Comparative studies,Educational policy,Teacher professional development,Communities of practice,Inquiry learning,Mixed-method research,Quantitative methods,Parental involvement in learning,Social sciences,Case studies,School effectiveness,Primary education,Secondary education,Special education,At-risk students

Sig's: SIG 1 - Assessment and Evaluation,SIG 15 - Special Educational Needs,SIG 23 - Educational Evaluation, Accountability and School Improvement,SIG 25 - Educational Theory

Chairperson: Athanasios Gregoriadis, Aristotle University of Thessaloniki, Greece

What we talk about when we talk about collaboration: An international analysis

Comparative studies,Educational policy,Teacher professional development,Communities of practice,Inquiry learning

Michelle Jutzi, University of Zurich, Switzerland; Rebecca Mazur, University of Massachusetts, United States; Rebecca H. Woodland, University of Massachusetts Amherst, United States;

Several international studies have identified collaboration in school settings as one important aspect of school improvement (Hargreaves & Fullan, 2013; Darling-Hammond & Rothman, 2012; Talbert 2010). Research on the definition and operationalization of this construct stems from different theoretical backgrounds and varies in its methodological approach. In this paper, we understand collaboration as an active, ongoing cycle of reflective inquiry and as a form of high-quality teaming between educators. We conduct a methodological and thematic review to generate a synthesis by comparing and contrasting written evidence between German-speaking countries and the US. We argue that international comparisons of existing literature may be a starting point for the future development of the analytical and empirical construct of collaboration; therefore, we focus on how the construct has been treated in theory, research, policy and practice. We found that international research on collaboration shows similar elements in these four key areas and faces an increasing demand to include innovative measuring methods such as the social network analysis or mixed-methods approaches. We argue that the gaps in understanding between theory, research, policy and practice may be constraining large-scale adoption of strong collaboration models.

Evaluation of the CANparent trial of universal parenting classes 2012-14

Mixed-method research,Quantitative methods,Educational policy,Parental involvement in learning,Social sciences

Geoff Lindsay, University of Warwick, United Kingdom; Vaso Totsika, CEDAR, University of Warwick, United Kingdom; Mairi-Ann Cullen, CEDAR, University of Warwick, United Kingdom; Stephen Cullen, CEDAR, University of Warwick, United Kingdom;

This paper reports results from the 2-year CANparent trial of universal parenting classes for parents of children aged 0-5 years in three English local authorities, which recruited 2956 parents. Part of a large scale combined methods study, the paper reports i) demographics of the parents that enrolled, to examine universal coverage; ii) the changes in parentsí mental well-being, parenting stress, and sense of efficacy as and satisfaction with being a parent, following attendance at parenting classes, in order to examine the effects of the classes; and iii) the results of two population surveys one year apart (total N = 4725) that examined parentsí attitudes to parenting classes, in order to explore the effects of possible sense of stigma. The paper will explore the conceptualisation and effectiveness of universal parenting classes as a government public education intervention; facilitators and barriers to implementation, including the role of stigma; and methods to improve take-up. As a result of the study the UK Government extended the trial a further year; data and consideration of the results of this extension will be incorporated in the paper.

School and classroom improvement through performance standards and performance feedback?

Case studies,Quantitative methods,Educational policy,School effectiveness,Primary education,Secondary education

Herbert Altrichter, Johannes Kepler University Linz, Austria; Regina Steiner, University of Education Upper Austria, Austria; Katharina Soukup-Altrichter, ph oo, Austria; Christine Plaimauer, University of Education Upper Austria, Austria; Eva Prammer-Semmler, University of Education Upper Austria, Austria;

During recent years many European education systems have attempted to modernize their governance by establishing some variety of an ìevidence-based governance regimeî. In Austria, a policy of performance standards has been introduced since 2008. In an explorative case study approach we want to analyse the processes by which policy innovations are communicated and ìre-contextualizedî at the various levels of a multi-level system and by which schools and teachers take up policy innovations and translate it into action and structures on school and classroom level. The following research questions are discussed: In what way (if at all) are performance standards and performance feedback taken up by Austrian primary and secondary schools? Are they used as stimuli and orientation for classroom and school development? The paper is based on a three-year qualitative research project consisting of six case studies of primary and secondary schools, mainly based on document analysis and qualitative interviews of participants and stakeholders of each school (Interviewing in a longitudinal design at three dates in the course of three consecutive years). Additionally, data from interviews with central and regional administrators etc. and from the central policy level (documents) was used. The study gives some insights into the various processes by which schools and teachers attempt to ìre-contextualizeî a policy innovation and to translate it into feasible processes and structures of work in classrooms and schools. Results point to difficulties of schools using the new governance instruments for organising school and classroom development.

Class size as a means of three-tiered support in Finnish primary schools

Quantitative methods,Educational policy,Special education,At-risk students,Primary education

Ninja Hienonen, University of Helsinki, Finland; Mari-Pauliina Vainikainen, University of Helsinki, Finland;

The aim of this study is to investigate how the class size is related to the development of performance of pupils receiving intensified or special support in primary school. In Finland, class size is also used as a means of support by placing pupils with milder support needs in slightly smaller classes in the three-tiered support model, resulting in seemingly surprising positive correlations between class size and performance in cross-sectional studies. The present study tests the scientific base of this common practice by following the development of 869 pupilsí learning to learn skills from the beginning of fourth grade to the end of sixth grade, analysing the effects of class size on the development of performance and the patterns of it in the groups receiving intensified or special support. The results confirmed that in Finland larger classes perform on average better, but as pupils with support needs study in slightly smaller classes, the effect was almost completely explained by initial differences and the pattern of development is relatively similar in all groups. Receiving special support predicted slower development of performance but without any class size effects. Pupils with milder support needs may slightly benefit from studying in smaller classes but the statistical power of the present data was not strong enough and more research is needed with larger samples.

E 6

26 August 2015 13:45 - 15:15

Room Brown_B2

Paper Presentation

Higher education

Higher education

Keywords: Quantitative methods,Social aspects of learning,Vocational education,Motivation and emotion,Teaching/instruction,Philosophy,Qualitative methods,Instructional design,Student learning,Competencies,Higher education,Educational attainment,Emotion and affect,Problem-based learning

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 4 - Higher Education

Chairperson: Hamish Coates, University of Melbourne, Australia

The role of person-environment fit and social identification for studentsí vocational success

Quantitative methods,Social aspects of learning,Vocational education,Motivation and emotion

Christoph Borzikowsky, Leibniz Institute for Science and Mathematics Education (IPN), Germany; Gabriel Nagy, IPN - Leibniz Institute for Science and Mathematics Education, Germany; Fabian Bernhardt, Leibniz Institute for Science and Mathematics Education, Germany;

Despite of suitable learning environments, past research discovered that a meaningful part of students perceive education as cognitive and emotional strain. Especially transitions into vocational trainings are perceived as enormous pressure because students have to handle both educational lessons as well as practical trainings. Consequently, students drop out and quit in many cases their whole educational career. In this study, we explored the problem of increasing dropout rates in vocational trainings from a social-organizational perspective. By combining person-environment fit perceptions (i.e., match between individuals and their environments) with social identification (i.e., individualsí perceived membership in a particular social group) we proposed a combined model that could help to increase studentsí vocational success. By analyzing answers of 235 students we confirmed the dimensional structure of our model and demonstrated with latent regression analyses a significant prediction of studentsí dropout intentions, studentsí perceived satisfaction with vocational training and studentsí learning motivation. Particularly, we contrasted the predictive power of a person-environment-fit-only-model against that of a combined model with social identification as an additional predictor and found the superiority of the latter one. Hence, the results of this study emphasize that a perceived match between students and their learning environments and, more particularly, a high identification with vocational training are both beneficial for studentsí vocational success.

Accordingly, we propose that teachers should focus especially on these two independent variables in order to enhance the likelihood that started vocational trainings will be successfully completed.

Encounter to one another? Analysing structural connectedness by peer feedback assignments

Quantitative methods,Teaching/instruction,Social aspects of learning,Philosophy

Tobias Hoelterhof, University of Duisburg-Essen, Germany;

As a modern understanding of Bildung, investigations in philosophy of education foster the experience of encounter to explore human plurality (Wahlstrom 2010; Biesta 2002). As a way of applying these general educational issues in the realm of online communication and higher education, this empirical study considers peer feedback assignments as enabling structures of encounter. Peer feedback can initiate participation in each otherís learning process (Topping 1998; Ertmer, Richardson, Belland et al 2007) and may thereby also enable an experience of different attitudes and opinions concerning a learning matter. A social network analysis of an online master program is performed in order to identify those structures in online forums as an impact of peer feedback assignments, that require students to develop and share a personal attitude towards a topic. The findings show that online forums of courses with peer assignment cover an appropriate structure for enabling possibilities for encounter, as far as encounter occurs as personal comments in online forums. In average participants of courses with two peer assignments had contact to 3 more different persons than participants of courses without peer assignments. Certainly an atmosphere of discourse and feedback not necessary implies encounter as an anthropological phenomenon, but it may be the step towards it.

Using the experiential approach to integrate generic competencies into higher education course

Qualitative methods,Instructional design,Student learning,Competencies,Higher education

Patrick Lai, The Hong Kong Polytechnic University, Hong Kong;

Barrie (2004) conducted a research to identify how academic staff understood, in phenomenographic perspectives, the concept of graduate attributes. A hierarchy of four empirically derived and increasingly complex categories were identified, namely precursory, complementary, translation and enabling conception. The ìtranslationî conception focuses on the intersection of the fields of ëgeneric competenciesí, ëdiscipline knowledgeí and ëprofessional practiceí and was appointed as the conception to guide the development of the ìPersonal Skills Developmentî course in an academic programme at the University level to integrate generic competencies into academic programmes. This study attempted to employ the ìexperientialî approach (Toohey, 1999) in course development to ëintegrateí generic competencies into courses of academic programmes. Two rounds of semi-structured interviews with 25 teachers of first-year students to identify the key generic competencies and their definitions. Based on this, further interviews with 32 department representatives and 27 final-year students led to the

construction of cases and problems around the identified key competencies. Results of the study indicated that 6 graduate attributes were identified. Details on the synopsis of the cases and how the course was structured around these cases for learning and teaching, using the experiential approach, will be discussed.

Research-based learning in German higher education: One size fits all?

Quantitative methods,Student learning,Teaching/instruction,Educational attainment,Emotion and affect,Problem-based learning

Hildegard Schaeper, DZHW - German Centre for Research on Higher Education and Science Studies, Germany;

Despite the Humboldtian tradition (or ideology) of linking research and teaching or learning in German higher education, representative quantitative data are rare. This is especially true when it comes to the benefits of research-based learning. The paper intends to reduce this research gap by providing evidence on the quantitative significance of research-intensive learning environments in German higher education, on the effects of research-based learning on student outcomes and on the conditional nature of learning environments on learning outcomes. Our analyses are based on data from the German National Educational Panel Study (NEPS). We will use information provided by a large sample of randomly selected first-year students who are longitudinally followed during their student days and beyond. Data were collected on several occasions during the year 2011 und 2012.

E 7

26 August 2015 13:45 - 15:15

Room Brown_B4

Paper Presentation

Higher education

Higher education

Keywords: Qualitative methods,Synergies between learning, teaching and research,Higher education,Inquiry learning,Quantitative methods,Student learning,Self-regulation,Cognitive development,Cognitive skills,Professions and applied sciences,Lifelong learning,Assessment methods and tools,Interdisciplinary

Sig's: SIG 14 - Learning and Professional Development,SIG 4 - Higher Education

Chairperson: Liesje Coertjens, University of Antwerp, Belgium

University teachersí approaches to linking teaching & research and use of digital technology

Qualitative methods,Synergies between learning, teaching and research,Higher education,Inquiry learning

Carlos Gonzalez-Ugalde, P. Catholic University of Chile, Chile; Sara Villagra, Universidad de Valladolid, Spain; Mauricio Quilpatay, Pontificia Universidad Catolica de Chile, Chile; Carolina Guzman-Valenzuela, University of Chile, Chile;

In this article we explore university teachersí approaches to linking teaching and research, and how they use digital technology for realising the nexus. Digital tools and technologies have substantially influenced practices through which knowledge is produced and disseminated. This needs to be considered if universities want students to have learning experiences that mirror disciplinary research. 35 university teachers were interviewed. Analyses show that, for this particular group of teachers, most make basic uses of digital technologies for research, even those with sophisticated learning designs for linking teaching and research. However, we identified a smaller group of teachers who, at the same time than presenting advances practices for bringing research to the undergraduate classroom, make sophisticated use of digital tools for research. We claim this group may be the basis for university teachersí academic development in this area.

Academic Preconceptions, Study Skills and Self-Regulated Learning in First Year Students

Quantitative methods,Student learning,Self-regulation,Higher education

Monica Londen, University of Helsinki, Finland; Jan-Erik Mansikka, University of Helsinki, Finland; Susanne Tiihonen, University of Helsinki, Finland;

Factors like academic self-efficacy, time management, self-regulated learning and study skills have repeatedly been identified to strongly correlate with academic success (Bandura et al. 2001, Biggs & Tang 2011, Lane & al. 2004, Yusuf 2011, Zimmerman 2000; 2002). There is also a strong connection between self-regulation and study pace (Haarala-Muhonen et al. 2011). Consequently, students who lack the necessary study skills and learning strategies often encounter challenges or a lack of motivation while pursuing their academic studies (Lahteenoja 2010, Poutanen & al. 2012, Rautapuro & al. 2011, Tinto 2006). The overall objective of this study is to examine how studentsí academic preconceptions influence their perceived study challenges and academic integration during their first year at university, and the development of their self-regulated learning during the course of their studies. The data collections for this study consists of web-based surveys administered to first year university students from different fields of studies at two universities in Finland. The surveys focus on challenges the students encounter, as well as on how the students experience their academic integration on a social, cognitive and affective level. All surveys include both multiple choice questions and open-ended questions. This study is part of a longitudinal study within the network Justice through Education in the Nordic Countries which is part of The Nordic Centre of Excellence.

ìI stand around and look friendlyî ñ Identifying deficits in medical studentsí ward round scripts

Qualitative methods,Cognitive development,Cognitive skills,Professions and applied sciences,Higher education,Lifelong learning

Esther Beltermann, University of Munich, Germany; Insa Wessels, Munich Center of the Learning Sciences, University of Munich, Germany; Ingo Kollar, University of Augsburg, Germany; Martin R. MRGFischer, Munich University Hospital, Germany;

Ward rounds represent a crucial activity in physiciansí daily practice in hospital. However, medical curricula lack adequate preparation for this task, and medical students report difficulties are reported. Referring to the script concept (Schank, 1999), we aimed at identifying ward round scripts of individuals of different expertise. Scripts are assumed to comprise four components (Fischer et al., 2013): play, scenes, roles, and scriptles that are analyzed in this study. Scriptlets were further examined with regard to their content (medical, social, administrative, teaching and learning; Walton & Steinert, 2010) and potential for knowledge construction (interactive, constructive, active, passive; Chi, 2009). Based on the structure formation technique, we conducted an interview study with N=50 participants (N=15 medical students in their second clinical semester, N=11 students in their practical year, N=12 residents, N=12 senior physicians). Analysis of frequencies of script components revealed that scripts show similarities on a structural level. In-depth analysis of both content and level of knowledge construction revealed significant differences between expertise groups: individuals on lower expertise emphasized domain general activities (social) and aspects not particularly relevant for ward rounds (i.e. stand around). With growing experience, individuals mentioned more domain-specific activities (medical). Residents, however, lacked to perceive teaching and learning as typical ward round activities. Moreover, students did not perceive ward roundsí potential for knowledge construction. There is a need to facilitating residents to understand ward rounds as teaching and learning environment, and to encouraging students to perceive ward rounds as encounter for knowledge construction.

Evaluation under scrutiny ñ How trustworthy is the studentsí judgment in higher education?

Quantitative methods,Assessment methods and tools,Interdisciplinary,Higher education

Elisabeth Fischer, University of Kassel, Germany; Martin Haenze, University of Kassel, Germany;

In Germany, an interest in quality of teaching in higher education only arose in the 1990s. Since then course evaluations have gradually grown to be an indispensable part of university life. However, both university teachers and scholars adopt rather ambiguous stands towards the informative value and validity of the student reports. As different studies show both factors on the side of the students and factors on the side of the lecturer and his teaching influence the studentsí judgment. The presented study investigates, which factors influence evaluative measures of university courses, and wants to answer the question, whether student reports can be

regarded as valid. These problems are worked on using data from 22 courses of different disciplines with student data from two points in time (beginning and end of term). Correlational analyses indicate that especially the interest of the student strongly influences his evaluation of the course. Multiple regression analyses further show that next to the interest his first impression of the lecturer has an effect on the overall satisfaction with the course at the end of the semester. The presented findings are, firstly, relevant for a correct interpretation of evaluation results on the side of the university teachers and, secondly, important for the future advancement of the evaluation instruments.

E 8

26 August 2015 13:45 - 15:15

Room Green_A5

Paper Presentation

Inquiry learning

Inquiry learning

Keywords: Qualitative methods,Teaching/instruction,Cognitive skills,Science education,Workplace learning,Inquiry learning,Experimental studies,Instructional design,Problem solving,Higher education,Mixed-method research,Educational policy,Attitudes and beliefs,Developmental processes,Secondary education,Psychometrics,Video analysis,Assessment methods and tools,Competencies

Sig's: SIG 17 - Qualitative and Quantitative Approaches to Learning and Instruction,SIG 18 - Educational Effectiveness,SIG 6 - Instructional Design

Chairperson: Margus Pedaste, University of Tartu, Estonia

The enhancement of pupils' critical thinking within inquiry-based science education (IBSE)

Qualitative methods,Teaching/instruction,Cognitive skills,Science education,Workplace learning,Inquiry learning

Catherine Dimitriadou, University of Western Macedonia, Greece; Sofia Avgitidou, University of Western Macedonia, Greece; Giorgos Malandrakis, University of Western Macedonia, Greece; Petros Kariotoglou, University of Western Macedonia, Greece;

Science offers pupils' significant opportunities to invent some ìhigher rationaleî to explain the world, thus promoting their critical thinking skills (Moon, 2008). For this reason, scientific skills closely related to critical thinking are given priority in the framework of inquiry-based science education (IBSE) (EC, 2007; Abd-El-Khalick et al., 2004). Taking into consideration the fundamental abilities of inquiry learning (NRC, 2000) and the characteristics of critical thinking

(Scriven & Paul, 2007), this paper explores in-service teachersí views and practices through a professional development project (ARISTEIA II) which promotes inquiry teaching approaches in all levels of compulsory education in Greece. Thirty four teachers were interviewed individually regarding their goals, teachersí and pupils' actions during science teaching and criteria/methods for assessment. Results indicate that although the IBSE supports active and self-regulated student learning, teachersí selected actions and evaluation criteria/forms of their teaching do not seem to enhance in depth pupilsí critical thinking. This is due to a lack of consistency between teachersí goals and their respective actions as well as teachers' goals and evaluation criteria of learning, teachersí lack of reference to specific ways to enhance their pupils' critical thinking skills and the emphasis that teachers put on ìrule ñfollowingî procedures to support their pupils' learning.

Effects of scaffolding and timing of modeling examples on skill acquisition in science education

Experimental studies,Instructional design,Cognitive skills,Problem solving,Science education,Higher education

Julia Murbock, Ludwig-Maximilians-Universitat (LMU), Germany; Karsten Stegmann, LMU Munich, Germany;

An effective way to foster skill acquisition is example-based instruction, e.g. with modeling examples and example-problem pairs. Usually modeling takes place before learners solve problems on their own. Recently, however, evidence was found that under certain circumstances learners benefit more if they solve problems before modeling takes place. This study addresses, (RQ1) to what extent the timing of modeling examples, scaffolding and the interaction thereof have effects on skill acquisition in science education and (RQ2) to what extent effects are mediated through mental effort. To investigate these questions, we varied the timing of modeling examples (before vs. just-in-time vs. after) and scaffolding of self-explanations and monitoring (with vs. without) in a 3x2 factorial design. First semester educational science students (N=126) learned one hour with four modeling examples and example-problem pairs how to conduct a design. The analyses show significant effects of timing: students in the conditions with just-in-time modeling examples learned significantly more and reported significantly lower mental effort than students with modeling examples afterwards. The effect of the just in time condition was mediated through mental effort. A comparison between presenting modeling examples before and after working on example-problem pairs as well as before and just in time showed no significant differences. The expected interaction between the timing of modeling examples and scaffolding was not found. This study shows in line with previous studies that presenting just in time modeling examples alternating with working on analog example-problem pairs leads to lower mental effort and therefore to higher skill acquisition.

The ASPIRES 2 Project: Understanding the development of science and career aspirations from 14-19

Mixed-method research,Educational policy,Attitudes and beliefs,Developmental processes,Science education,Secondary education

Julie Moote, King's College London, United Kingdom;

There are widespread national and international concerns that not enough young people are continuing with science post-16 (Archer et al., 2010; Bennett & Hogarth, 2009; George, 2000). As attitudes towards science have been found to be a strong predictor of performance outcomes (Hattie, 2009; Martin, Mullis, Foy, & Stanco, 2012), these trends are worrying for science educators. Further, in a meta-analysis of studies looking into student interest and attitudes towards science, Awan and colleagues (2011) found that students in developed countries showed lower interest and less positive attitudes in science than students in developing countries. Therefore these issues are extremely relevant for the Western world. This paper will present preliminary findings from the ëASPIRES 2í study, a five-year project aiming to understand the processes through which students develop their science and career aspirations between the ages of 14 and 19. Through conducting large-scale surveys (c.7-10,000 students per sweep) of a nationally representative sample of the cohort and a series of individual interviews with students and parents, this research will extend the unique dataset provided by the first ASPIRES study, which tracked the development of this cohortís science and career aspirations from age 10-14.

A theory-based investigation of inquiry skills and classroom activities in the context of chemistry

Psychometrics,Video analysis,Assessment methods and tools,Competencies,Science education,Inquiry learning

Andreas Nehring, Leibniz Universitat Hannover, Germany; Kathrin H. Nowak, Humboldt-Universitat, Germany; Annette Upmeier zu Belzen, Humboldt-Universitat, Germany; Rudiger Tiemann, Humboldt-Universitat, Germany;

The acquisition of process skills in the field of scientific inquiry constitutes a central learning goal in most science education curricula. Against this background, we have developed a theoretical framework that describes and categorizes studentsí skills in scientific inquiry by defining nine epistemological acts. In an empirical study we developed and administered a multiple choice test in order to assess these skills in the context of chemistry at the secondary school level. Furthermore, we conducted a video study to observe the inquiry learning opportunities that teachers provide in chemistry classrooms. The sample consisted of 780 students at the lower and upper secondary school levels of Berlin Schools. 27 chemistry lessons were filmed and analysed in the video study. Concerning the assessment of inquiry skills, the Rasch-based analysis revealed that 85 out of 90 items have satisfactory item characteristics and form reliable scales. The analysis of model fit statistics provide information supporting multidimensionality. The cognitive, affective and sociodemographic characteristics of the students predict their inquiry skills to a large extent (55 %). The results of the video study show that learning opportunities for on two out of nine epistemological acts primarily provided when chemistry teachers implement inquiry based learning. The presentation deepens these findings and connects the results of the video study with the assessment of inquiry skills.

26 August 2015 13:45 - 15:15

Room Brown_B5

Paper Presentation

Instructional models and strategies

Instructional models and strategies

Keywords: Experimental studies,Meta-analysis,Quantitative methods,Cultural diversity in school,School effectiveness,Student learning,Achievement,Social development,Primary education,Comparative studies,Cognitive skills,Self-regulation,Secondary education,Teaching/instruction,Argumentation,Science education,Computer-assisted learning

Sig's: SIG 17 - Qualitative and Quantitative Approaches to Learning and Instruction,SIG 18 - Educational Effectiveness,SIG 7 - Learning and Instruction with Computers

Chairperson: Liisa Ilomaki, University of Helsinki, Finland

Abstract differentiated instruction: a literature review on the effectiveness of different teaching

Experimental studies,Meta-analysis,Quantitative methods,Cultural diversity in school,School effectiveness,Student learning

Catherine Coubergs, Vrije Universiteit Brussel (VUB), Belgium; Katrien Struyven, Vrije Universiteit Brussel (VUB), Belgium; Nadine Engels, VUB, Belgium;

This literature review focuses on the effects of teaching methods used to differentiate in primary and secondary education classrooms. A broad literature search was carried out in orde to locate every article that investigated the differential effectiveness of several teaching methods. Only studies that met the following criteria were included: quantitative research was prefered above qualitative research, samples from primary and secondary schools were selected and peer reviewed articles published between 1995 and 2013 were implemented. After apllying these criteria the search produced a set of 161 relevant articles. In this article differentiated instruction was defined as dealing with differences between students in order to provide every student with a maximum of learning opportunities. By making a distinguishment between divergent differentiation (breaks up differences between pupils) and convergent differentiation (uniting differences between pupils), we aimed to look for the effectiveness of different teaching methods used to differentiate between pupils. Results show empirical evidence on the (differential) effectiveness of some forms of divergent and convergent differentiation. However, also impediments are found. The available empirical research data often compare different teaching methods within an experimental design, resulting in evidence for the effectiveness of the teaching method, without showing any proof of differential effects on students learning, which

does nog allow for conclusions on the effectiveness of specific teaching methods for differentiated intstruction.

A meta-analysis of the effects of classroom management strategies and programs on student outcomes

Meta-analysis,Achievement,Social development,Primary education

Hanke Korpershoek, University of Groningen, Netherlands; Truus Harms, University of Groningen, Netherlands; Hester de Boer, University of Groningen, Netherlands; Mechteld van Kuijk, University of Groningen, Netherlands; Simone Doolaard, University of Groningen, Netherlands;

This meta-analysis examined which classroom management strategies and programs enhanced studentsí academic, behavioural, social-emotional, and motivational outcomes in primary education. The analysis included 54 quasi-experimentally controlled intervention studies published in the last decade. Results showed small but significant effects (average Hedgesí g 0.22) on all outcomes. Programs were coded for the presence/absence of four categories of strategies: those focusing on the teacher, on student behaviour, on studentsí social-emotional development, and on teacher-student relationships. Focusing on the studentsí social-emotional development appeared to have the largest contribution to the interventionsí effectiveness, in particular on the social-emotional outcomes. Academic outcomes seemed to benefit from teacher-focused programs. This work is part of the research programme ëNWO Review Studiesí, which is (partly) financed by the Netherlands Organisation for Scientific Research (NWO).

Developmental order of learning strategy use: IRT analysis of data from Japan and China

Comparative studies,Quantitative methods,Student learning,Cognitive skills,Self-regulation,Secondary education

Yuri Uesaka, The University of Tokyo, Japan; Masayuki Suzuki, National Institute of Infomatics, Japan; Mengting Wang, The University of Tokyo, Japan; Shin'ichi Ichikawa, The University of Tokyo, Japan;

Although many studies have shown that utilizing effective learning strategies is an important determinant of success in academic achievement, one important perspective that has not been sufficiently examined in previous learning strategy research are the developmental aspects of learning strategies, such as studentsí developmental stages in learning strategy acquisition and the developmental order of learning strategies on a continuum from those that are easily acquired during the early stage of development to those that are more difficult and are acquired in later stages of development. In order to examine whether there is a shared cross-cultural developmental order, frequency of learning strategy use data assessed by a questionnaire were taken from Japanese (n=472) and Chinese participants (n=242), and factor analysis and item response theory (IRT) analysis were conducted. The result of factor analysis revealed that the factor structure used for IRT analysis in the two countries can be considered similar. In addition, the developmental orders of learning strategy use in the two countries, which were estimated by

IRT analysis, were confirmed as similar through analysis using Spearmanís rank-correlation coefficient with the two countriesí order information (.56). Although such a developmental aspect has been overlooked in previous learning strategy research, the results suggest a cross-cultural developmental process in acquisition of effective learning strategies that is shared ñ at least between two cultures examined in this study.

Fostering skill and will of argumentative thinking through training interventions

Experimental studies,Teaching/instruction,Argumentation,Science education,Secondary education,Computer-assisted learning

Markus H. Hefter, University of Bielefeld, Germany; Alexander Renkl, University of Freiburg, Germany; Werner Riess, University of Education, Freiburg, Germany; Sebastian Schmid, University of Regensburg, Germany; Stefan Fries, University of Bielefeld, Germany; Kirsten Berthold, University of Bielefeld, Germany;

While processing conflicting scientific positions, learners should engage in argumentative thinking in order to develop deep understanding and come to well-founded conclusions. Thus, it seems feasible to develop and test appropriate instructional approaches to foster both the learnersí skill (i.e., ìcompetenceî) and will (i.e., ìengagementî) of argumentative thinking. Based on a previous skill-training and a previous will-training intervention, our main goal was to develop and test a short-term training intervention on both skill and will of argumentative thinking (i.e., combined-training intervention). We tested this new combined-training intervention in a between-subjects design comprised of five conditions: (a) previous skill-training intervention, (b) previous will-training intervention, (c) combined-training intervention, (d) combined-training intervention with reversed sequence of skill- and will-components, and (e) no-training intervention (control condition). Participants were 147 German high school students (mean age: 17.36 years, 80 females). We assessed skill-facets (i.e., declarative and procedural knowledge about argumentation), will-facets (i.e., epistemic orientation, intellectual values, and conceptual knowledge about both constructs), and argument quality. Results showed that our combined-training intervention fostered not only both skill-facets and will-facets, but also argument quality. Moreover, we gained two major insights into learning processes during the training intervention that are crucial for argument quality. First, providing the interventionís will-component before the skill-component resulted in higher argument quality. Second, self-explanations of skill- and will-principles mediated the effect on argument quality.

E 10

26 August 2015 13:45 - 15:15

Room Green_A6

Paper Presentation

Learning disabilities and special education

Learning disabilities and special education

Keywords: Case studies,Assessment methods and tools,Learning disabilities,Mathematics,Secondary education,Experimental studies,Special education,Primary education,Computer-assisted learning,Quantitative methods,Social aspects of learning,Student learning,At-risk students,Metacognition,Self-regulation,Higher education

Sig's: SIG 1 - Assessment and Evaluation,SIG 15 - Special Educational Needs,SIG 4 - Higher Education

Chairperson: Ines Borges, Universidade Nova de Lisboa, Faculdade de Ciencias e Tecnologia, Portugal

Inclusive assessment as a strategy to attend pedagogically students with learning disabilities

Case studies,Assessment methods and tools,Learning disabilities,Mathematics,Secondary education

Mila Naranjo Llanos, University of Vic, Spain; Veronica Jimenez Perales, University of Vic, Spain;

The Socio- cultural perspective has emphasized the profound interrelationship between teaching and learning and assessment processes (eg Gipps, 2002). It has also called attention to the importance of using certain assessment tools and forms in order to develop inclusive schools and classrooms (Tharp, Estrada, Dalton and Yamauchi, 2000). According to this approach, the present work aims to analyze the adaptability of these practices to the student difficulties and to understand some of the factors that influence teachers to develop assessment practices more inclusive. To do this, we have analyzed the processes of teaching, learning and assessment of 21 groups of students in the 4th year of secondary school (16 years). These 21 groups are from four high schools with different features. Each school used all groups in the subject of Mathematics to students of 4th ESO was provided. For each of the processes, were conducted several interviews with the respective teachers, and samples of assessment instruments used were collected both with students with learning difficulties as the others. The collected data were analyzed according to a category system based on the analysis model of interactivity proposed by Coll and colleagues, reviewed and adapted to the study of situations and assessment activities (Coll, Barbera and Onrubia, 2000). Results show that assessment practices developed by teachers and students do not have a high degree of adaptability. Also show that although the assessment practices used to assess students with learning difficulties in mathematics are different from those used with other students, were not more adaptive and inclusive.

Efficiency of the RDI for improvement of mathematical competences in ADHD and LD students

Experimental studies,Special education,Learning disabilities,Mathematics,Primary education,Computer-assisted learning

Celestino Rodriguez, University of Oviedo, Spain; Paloma Gonzalez-Castro, University of Oviedo, Spain; Julio Antonio Gonzalez-Pienda, University of Oviedo, Spain; Debora Areces, University of Oviedo, Spain; Marisol Cueli, University of Oviedo, Spain; Georgios Sideridis, University of Crete, Greece;

Problem solving is currently a critical skill in which students with Mathematical Learning Difficulties (MLD) and students with Attention Deficit/Hyperactivity Disorder (ADHD) display great difficulties. In order to deal with mathematical competence, we propose a computerized intervention tool, the Integrated Dynamic Representation (IDR) for early learning of basic mathematics abilities and problem solving. The goal of this work was to analyze the effect of IDR on the performance of tasks involving informal and formal mathematical competences in students with ADHD, MLD or ADHD+MLD, and to analyze its differential effect as a function of the diagnosis. Participants were 216 students (6 to 9 years), classified into three groups: students with ADHD (n = 72), students with MLD (n = 82), and students with ADHD+MLD (n = 62). The selected students were randomly assigned to one of two experimental conditions: an Experimental Group (EG) which received the intervention with IDR; a Control Group (CG). Prior to and following the intervention, students completed the Test of Early Mathematics Ability (TEMA 3), which assesses basic informal and formal mathematical competences. Results showed that all three diagnosed groups improved significantly after the intervention in all mathematical competences assessed, with the MLD group achieving the best results at post-intervention assessment.

Is a high rate of self- and parent-assessed peer problems typical for students with disabilities?

Quantitative methods,Special education,Learning disabilities,Social aspects of learning,Primary education

Marco Hessels, University of Geneva, Switzerland; Susanne Schwab, University of Bielefeld, Germany; Markus Gebhardt, TU Munchen, Germany; Lena Nusser, Leibniz Institute for Educational Trajectories, Germany;

Peer problems are common in children with special educational needs (SEN), but the reasons are poorly understood. We seek to identify the prevalence and risk factors of peer problems, such as SEN, school setting and prosocial behaviour for their occurrence. A subsample of 3í900 children in 6th grade from the National Educational Panel Study, a Germany-representative cohort study was analysed. The study comprised 498 students who are impaired regarding their learning, academic achievement and or their learning behaviour attending a special school, 280 students with either learning disabilities, social and emotional disorders or intellectual disabilities attending an inclusive class, and 3122 students without SEN. Both children and parents answered on two subscales, ëpeer problemsí and ëprosocial behaviourí, of the Strength and Diffculties Questionnaire (SDQ). Students with SEN (attending special schools or inclusive classes) are more likely to score within the abnormal range of the SDQ subscale peer problems than students without SEN. The results further show a low level of parent-child agreement on the subscale ëpeer problemsí. Logistic regression analyses show that having SEN is always an explaining variable for ëpeer problemsí and that group differences cannot be fully explained by gender,

school setting or ëprosocial behaviourí. Parent-ratings of ëpeer problemsí might be more accurate than self-ratings of students with SEN, because they probably underestimate their ëpeer problemsí. Prosocial behaviour cannot fully explain differences between groups; having been identified as having SEN or not is always an explaining factor. The SEN label may stigmatize and provoke ëpeer problemsí.

Studying with dyslexia: The use of study strategies in three different study contexts

Quantitative methods,Student learning,At-risk students,Metacognition,Self-regulation,Higher education

Rune Andreassen, Ostfold University College, Norway; Magne S. Jensen, Ostfold University College, Norway;

Building on prior research and theory concerning dyslexia and study strategies in higher education, this study investigated dyslexic Norwegian-speaking undergraduate studentsí use of self-regulated study strategies compared to their non-dyslexic peers. We used an alternative research method compared to the more commonly used questionnaire and interview, namely a structured Web-based diary. 34 students (17 dyslexics and 17 non-dyslexics) completed diaries of their study strategies for 12 successive days. Students in the two groups were matched in pairs based on gender, approximate age, and study program. Results showed that most of the dyslexics reported a limited study strategy repertoire. Certain strategies were commonly used by both dyslexic and their non-dyslexic peers, but the dyslexic students reported more use of social study strategies.

E 11

26 August 2015 13:45 - 15:15

Room Green_A7

Paper Presentation

Mathematics education

Mathematics education

Keywords: Experimental studies,Cultural diversity in school,Social aspects of learning,Mathematics,Primary education,Learning in context,Psychometrics,Pre-service teacher education,Cognitive skills,Higher education,Design based research,Special education,Cognitive development,Learning disabilities,Conceptual change,Reasoning

Sig's: SIG 11 - Teaching and Teacher Education,SIG 15 - Special Educational Needs,SIG 21 - Learning and Teaching in Culturally Diverse Settings,SIG 3 - Conceptual Change

Chairperson: M. Carmen Canto, University of Cadiz, Spain

Are primary school students aware of social information conveyed by mathematical word problems?

Experimental studies,Cultural diversity in school,Social aspects of learning,Mathematics,Primary education,Learning in context

Ester Koilis, University of Haifa, Israel; Billie Eilam, University of Haifa, Faculty of Education, Israel;

Mathematical word problems frequently convey unpremeditated social messages. Studies in critical mathematics education emphasize the importance of such messages for studentsí socialization. These studies assume that students are fully aware of social aspects of the situations presented in word problems. However, empirical evidence of such awareness remains sparse and contradictory. Therefore, the aim of the present study was to examine studentsí awareness of social information conveyed by word problems. Primary school students (N = 219) were introduced to a novel social context via word problems they solved during a routine classroom test. Twenty-four hours later they were asked to consider the different situations presented in the problems. Analysis of participantsí responses suggested studentsí awareness of the social content presented. The amount of social information recalled increased with the increase in student age. In addition, students of different sex and socio-economic status exhibited differential selectiveness regarding the particular social facts recalled. Although the present studyís findings confirm studentsí awareness of social information conveyed by word problems, claims for a causal effect of exposure to such information on studentsí social attitudes, require further investigation.

Looking beyond the data: Informal statistical inference skills of primary school student teachers

Psychometrics,Pre-service teacher education,Cognitive skills,Mathematics,Higher education

Arjen de Vetten, VU University Amsterdam, Netherlands; Bert van Oers, VU University Amsterdam, Netherlands; Judith Schoonenboom, University of Vienna, Austria; Ronald Keijzer, Utrecht University, Netherlands;

Little is known how to teach statistics to primary school student teachers. From research outside teacher education we know that one way to teach conceptual understanding of statistics is to let students learn to make informal statistical inferences (ISI). ISI is defined as the process of making generalizations beyond the data collected without the use of formal statistical tests. Teaching can only be effective if it builds on pre-existing skills of students. However, we know of no studies that investigate the pre-existing ISI skills of student teachers when they start teacher education. The aim of the current research project is therefore to measure the ISI skills of beginning student teachers. Around 1000 first-year student teachers from 8 teacher colleges for primary education in the Netherlands filled in a test consisting of five tasks that together measure which ISI strategies student teachers employ. Each task consists of an open question and a number of statements. First results indicate that student teachers are reluctant to use data as evidence to generalize. Many student teachers overestimate the required sample size and do not

belief that random sampling leads to a representative sample. The results of their ability to use statistical models are mixed. We expect the insights into the ISI skills of student teachers to be indispensable knowledge for researchers wishing to investigate how to teach statistics at teacher colleges.

Observation of mathematics problems based on Action Theory

Design based research,Special education,Cognitive development,Learning disabilities,Mathematics,Primary education

Marie-Jose Bunck, HU University of Applied Sciences Utrecht, Netherlands; Els Terlien, HU University of Applied Sciences Utrecht, Netherlands; Mieke Van Groenestijn, HU University of Applied Sciences Utrecht, Netherlands;

Children with severe mathematics problems should be taught by teachers with a focus on the childís best way of learning mathematics. The present study aims to explore and analyze the levels of acting on the domains of addition, subtraction, multiplication en division with children in the Dutch grade 1-5 (Kindergarten ñ grade 3). The domains are subdivided in detailed sub-domains. In total 130 items were composed at four levels of action. The items are developed based on half-year levels for each grade. About a hundred specialized teachers were trained in doing adaptive interviews with individual children. The results are shown in coloured profiles which make the childrenís strong and weak points at these sub-domains visible. These results enable teachers to fine-tune their interventions. In total 354 children were interviewed twice in one school year, halfway and at the end of the same school year. The first statistic analyses show that the items of the instrument are valid as a whole and per grade. By applying this instrument it will be possible to discover (severe) mathematics problems in an early stage and to prevent worse by effective fine-tuned teaching. At the conference we will present the first results of our research. (199 words) Keywords: early numeracy, numbers, elementary mathematics, levels of acting, special education, special educational needs (SEN)

Do executive functions predict the whole number bias in solving valid syllogisms?

Cognitive development,Conceptual change,Reasoning,Mathematics

Dimitris Pnevmatikos, University of Western Macedonia, Greece; Athina Karamanidou, University of Western Macedonia, Greece;

Recent findings have shown that elements of the intuitive framework theories are not abandoned after learning scientific concepts, but continue to co-exist and interfere to scientific and mathematical concepts even in well educated adults. This study examined whether studentsí difficulty in rational numbers, known as ìwhole number biasî could be interpreted in the light of the dual-process theory and the involvement of the executive functions. Thus, we adopted the methodology of the dual-process theory, namely the belief bias that interferes in solving deductive syllogisms with mathematical problems to detect the ìwhole number biasî. We assumed that the executive functions of inhibition, shifting and updating of working memory could predict the conscious inhibition of whole number knowledge. In this study 12-years-old

children and first-year undergraduate university students were examined in sixteen deductive syllogisms on concepts of school mathematics, in half of which the conclusion was compatible with whole number bias and the other half were not. Additionally, executive functions were tested with inhibition tasks (i.e. STROOP), shifting tasks (i.e. Number ñ Letter) and updating tasks (2-back). Students made more errors on incompatible items and they took longer than the school children in order to assess correctly the validity of syllogisms. This evidence indicates that students were hampered by their prior knowledge about natural numbers. Linear regression analysis showed that updating but not inhibition or shifting can predict the efficiency in judging the rightness of the incompatible syllogisms. This evidence is interpreted in the light of dual-processing theory. Educational implementations are discussed.

E 12

26 August 2015 13:45 - 15:15

Room Brown_B7

Paper Presentation

Motivation

Motivation

Keywords: Quantitative methods,Student learning,Attitudes and beliefs,Culture,Mathematics,Secondary education,In-service teacher education,Teacher professional development,Self-regulation,Social sciences,Motivation and emotion,Emotion and affect,Social aspects of learning,Higher education,At-risk students,Cognitive development,Emotion and cognition,Goal orientation

Sig's: SIG 8 - Motivation and Emotion

Chairperson: Cornelis de Brabander, Leiden University, Netherlands

Beliefs about mathematics and mathematics education of Ecuadorian students of grades 8 to 10

Quantitative methods,Student learning,Attitudes and beliefs,Culture,Mathematics,Secondary education

Erik De Corte, University of Leuven, Belgium;

The investigation reported in this article aims at analyzing and describing the mathematics-related beliefs of Ecuadorian students of grades 8 to 10 of ìEducacion General Basicaî. Embedded in related research carried out in several parts of Europe over the past two decades, an adapted version of the Mathematics-Related Beliefs Questionnaire (MRBQ) was administered in Zone 6 of Ecuador to a representative sample of 447 students belonging to 15 schools: 150 of

grades 8 and 9, and 147 of grade 10; 60% boys and 40% girls; 9 urban and 6 rural schools. A short questionnaire ìEnsenar Matematicasî (ìTeaching Mathematicsî) was also applied to the mathematics teachers of the participating classes. A principal component analysis resulted in a four-factor solution accounting for 46.8 % of the variance. Three of the four factors converge with those found in previous studies in Europe. The scores on the four factors of the total sample and the different subsamples tend to coincide with the neutrality score on the Likert-scale. A MANOVA on the data resulted in a main effect of grades and location (urban vs rural), and an interaction effect grade x sex. Whereas no significant difference were found between the boys of the three grades, there were several differences between the grades of the girls. However, no main effect for sex was observed indicating that overall boysí and girlsí math-related beliefs do not differ and tend to neutrality: neither negative but also not really positive.

Teachers' engagement in professional learning: Effects of job demands,job resources, and motivation

Quantitative methods,In-service teacher education,Teacher professional development,Self-regulation,Social sciences,Motivation and emotion

Joost Jansen in de Wal, Open University, Netherlands; Rob Martens, Open University, Netherlands; Antoine van den Beemt, Eindhoven University of Technology, Netherlands; Perry den Brok, Eindhoven University of Technology, Netherlands;

This paper addresses how teachersí engagement in professional learning may be explained from self-determination theory and the job demands-resources model. It is hypothesized that job demands and job resources predict teachersí motivation for professional learning. Secondly, basic psychological need satisfaction is expected to mediate the relation between job demands, job resources and teachersí motivation for professional learning. Finally, it was hypothesized that teachersí engagement in professional learning is predicted by job demands and job resources via basic psychological need satisfaction and motivation. These hypotheses were tested by means of two waves of questionnaire data collected from 622 Dutch secondary school teachers. Preliminary results show that job demands and job resources are related to teachersí motivation for professional learning. Moreover, this relationship is mediated by the extent to which teachersí basic needs are satisfied. Finally, the data indicate that longitudinal relations are present and that engagement in professional learning follows from job demands, job resources, basic need satisfaction, and motivation. The results of this paper may guide school leaders in creating work environments that support teachersí engagement in professional learning.

Effects of family background on sense of belonging and subjective well-being at university

Quantitative methods,Emotion and affect,Social aspects of learning,Higher education,Motivation and emotion

Stefan Janke, University of Mannheim, Germany; Selma Carolin Rudert, University of Basel, Switzerland; Tamara Marksteiner, German Institute for International Educational Research (DIPF), Germany; Oliver Dickhaeuser, University of Mannheim, Germany;

The need to belong has proven to be fundamental for the development of studentsí well-being, motivation and performance in institutions of higher education. Previous research has shown that especially students from ethnic minorities and a low-status social class often experience exclusion in university due to a higher sensitivity for possible cues of exclusion. Here we postulate that freshman students whose parents have no background in academia experience a lower sense of belonging to their new academic social context than students whose parents earned academic degrees. Furthermore, we assume that this reduced sense of belonging should - in a next step - result in decreased well-being and more test anxiety. A sample of 319 German University students answered an online survey at two measurement points (start of the first and the second semester). In line with our hypotheses, students without academic family background reported a lower sense of belonging at the first measurement point compared to students with academic family background. Cross-lagged panel analyses showed that this lack of felt belongingness resulted in less satisfaction with studying and more test anxiety at the second measurement point. Future research should investigate if the observed difference in perceived belonging is caused by self-stigmatization or differences in the amount of contact with other academics at earlier points in live. Regardless of the exact process, the present results emphasize the importance to find new ways to include students at university whose families have no backgrounds in academia.

A motivational-volitional perspective on engagement

At-risk students,Cognitive development,Emotion and affect,Emotion and cognition,Goal orientation

Michael Filsecker, University of Duisburg-Essen, Germany;

Engagement has been associated to different positive outcomes in students. However, academics frequently use the terms motivation and engagement interchangeably. In this article, I suggest that researchers should differentiate engagement from motivation and conceptualize it as a volitional process. Furthermore, it is argued that by doing so, a new meaning and reconceptualization of the trilogy of engagement (behavioral, emotional and cognitive) can be achieved that can help understand the process by which students successfully overcome setbacks and difficulties or become vulnerable and develop negative trajectories of low participation, interest and drop out. The paper closes by providing a tentative definition of engagement from a motivational-volitional perspective.

E 13

26 August 2015 13:45 - 15:15

Room Cyan_F1

Paper Presentation

Online learning/e-learning

Online learning/e-learning

Keywords: Educational technology,Instructional design,Technology,E-learning/ Online learning,Motivation and emotion,Quantitative methods,Teaching/instruction,Self-regulation,Secondary education,Content analysis,Video analysis,Social aspects of learning,Interdisciplinary,Higher education,Communities of learners,Design based research,Language (L1/Standard Language)

Sig's: SIG 1 - Assessment and Evaluation,SIG 11 - Teaching and Teacher Education,SIG 4 - Higher Education,SIG 6 - Instructional Design

Chairperson: Rebeca Cerezo, University of Oviedo, Spain

Addressing the retention gap in MOOCs: A motivational framework for MOOCs instructional design

Educational technology,Instructional design,Technology,E-learning/ Online learning,Motivation and emotion

Stylianos Mystakidis, University of Patras, Greece; Christothea Herodotou, The Open University, United Kingdom;

Existing design schemes of Massive Open Online Courses (MOOCs) usually focus on pedagogy, assessment and technology and rarely take into account learnersí experience and motivation. Drawing from the success of quest-based initiatives, gamified web platforms, and multi-user digital games, this paper introduces an innovative motivational framework for MOOCs instructional design coined as Open Quest Framework (OpenQuest). The framework is grounded on established motivational theories such as the Self-Determination Theory and Situated Motivational Affordance. It features specific motivational mechanisms including, quests and narration, reputation systems, progression mechanisms, multiple learning pathways, well-designed feedback and social elements, that can be used to enhance learners' engagement and reduce attrition rates in MOOCs.

Significance of studentsí net access in class for their academic self-control

Quantitative methods,Educational technology,Teaching/instruction,Self-regulation,Secondary education

Thomas Arnesen, Stord/Haugesund University College, Norway; Eyvind Elstad, University of Oslo, Norway;

The neo-liberal turn in educational thinking has weakened the unitary nature of the Nordic model of education. In terms of consumer orientation and state regulation and control, Finland and Norway/Sweden represent opposite ends of a continuum. Teachers are highly respected in Finland, but not in Norway and Sweden. Results from international comparative tests reveal a gap between the excellent Finnish results and the average Norwegian and Swedish ones. At the

same time, Norway and Sweden have invested heavily in educational technologies, in comparison to the more modest Finnish initiatives. One core educational objective is the acquisition of abstract knowledge which demands sustained self-control in academic work. However, many students experience a conflict between their academic ambitions and their digital activities. We ask: To what extent is the current provision of Internet access in class positively related to this sense of conflict, and how is this conflict related to studentsí self-control in Finland versus Norway/Sweden? In what ways are the associations between distinct quality aspects of teaching and studentsí self-control different in Finland as compared to Norway/Sweden? Structural equation modelling was carried out and the results compared based on 3400 student answers to a questionnaire administered in 60 secondary schools in Finland and Norway/Sweden. The results show a moderately positive relation between net-access and a sense of school-net conflict in Norway/Sweden, but zero association in Finland. In turn, there is a larger negative association between a sense of school-net conflict and studentsí self-control in Norway /Sweden than in Finland.

Teaching presence as overarching ëconditioní in an online community of inquiry in higher education

Content analysis,Video analysis,Social aspects of learning,Interdisciplinary,Higher education,Communities of learners

Helga Dorner, Central European University, Hungary;

This study examines how teaching presence, social presence and cognitive engagement were created and supported in a fully redesigned collaborative research seminar that involved two communities of international graduate students from a Hungarian and a US university engaged in synchronous web-conferencing and asynchronous online activities. We investigate the differences between the two collaborating communities in terms of studentsí social and cognitive engagement; and we also focus on the effect of teaching presence in facilitating the learning processes in this unique setup. As found, despite the design efforts to create one online community of inquiry, only one group showed social qualities that could make it a performing group demonstrating sense of cohesion and strategies for interactivity. In this process, teaching presence functioned as overarching ëconditioní that linked social and cognitive dimensions.

Fostering online disciplinary engagement, understanding, & achievement with participatory assessment

Design based research,Educational technology,Social aspects of learning,Language (L1/Standard Language),E-learning/ Online learning,Secondary education

Daniel Hickey, Indiana University, United States; Rebecca Itow, Indiana University, United States; Joshua Quick, Indiana University, United States;

A new design framework for networked online learning was used by five new teachers to create and teach four English Language Arts courses. This work was part of a reorganization of an online university-run secondary school as it moves beyond conventional individualized ìdistance

educationî courses. This new framework is rooted in situative theories of knowing and participatory approaches to learning and assessment. The framework first ìproblematizesî disciplinary course knowledge from the perspective of the learner (rather than an expert). Doing so allows for a simple scalable strategy for fostering productive disciplinary engagement and deep personal connections in courses. The framework aligns increasingly formal assessment methods to holding students accountable for disciplinary engagement and learning, but without undermining informal and social engagement. The framework was used to develop a fully online professional development workshop for the new teachers who designed and taught four two-semester courses for grades 9-12. This case study of one of those courses illustrates the synergy between personalized learning contexts, the problematizing routine, open wikifolios, peer questioning & commenting, artifact reflections, formal assessments, and conventional tests. This delivered remarkably high levels of individual and social engagement with the disciplinary knowledge that appeared extremely productive in terms of enduring understanding and achievement.

E 14

26 August 2015 13:45 - 15:15

Room Green_A8

Paper Presentation

Researcher education

Researcher education

Keywords: Quantitative methods,Researcher education,Interdisciplinary,Doctoral education,Higher education,Comparative studies,Emotion and affect,Motivation and emotion,Self-efficacy,Secondary education,Inquiry learning

Sig's: SIG 21 - Learning and Teaching in Culturally Diverse Settings,SIG 24 - Researcher Education and Careers

Chairperson: Chaya Herman, University of Pretoria, South Africa

The downside of external funding: Does it affect doctoral supervision?

Quantitative methods,Researcher education,Interdisciplinary,Doctoral education,Higher education

Gitte Wichmann-Hansen, Aarhus University, Denmark; Kim Jesper Herrmann, Aarhus University, Denmark;

Background: Supervisors are under growing pressure to generate funding from external sources and, as a result, to deliver timely completions. Given the pressured conditions under which

supervisors now have to work, we hypothesized that supervisors of external funded projects risk applying a more interventionist approach, often referred to in the literature as ëhands-oní supervision. Aim: To develop a scale measuring the degree of supervisor control in doctoral studentsí research projects (hands-on supervision), and to investigate whether the degree of control in the supervision process is related to project funding. Sample: 1,780 doctoral students (response rate 79 percent) from a large Scandinavian university, representing arts, social, health and natural sciences. Methods: PCA was used to develop a five-item scale for ëhands-oní supervision. ANCOVA was used to analyse correlation between external funding and ëhands-oní supervision, controlled for the effect of disciplinary background. Results: Overall, doctoral students in externally funded projects experienced more hands-on supervision than doctoral students who were not externally funded. When controlled for disciplinary variation, correlation between external funding and hands-on supervision was significant in the health sciences, but not in the natural and social sciences. Within arts, correlations were significant at a p.10 level. Conclusion: The hypothesized link between external funding and supervision approach was partly confirmed, but disciplinary context seems to moderate findings.

Domestic and international studentsí emotional engagement in, and motivation for, doctoral studies

Comparative studies,Researcher education,Emotion and affect,Interdisciplinary,Doctoral education,Motivation and emotion

Yusuke Sakurai, University of Tokyo, Japan; Jenna Vekkaila, University of Helsinki, Finland; Kirsi Pyhalto, University of Oulu; University of Helsinki , Finland;

This study examines whether students who start their doctoral degrees with different motivational profiles differ in their level of emotional engagement in their studies as measured by their level of satisfaction. It also addresses similarities and differences between domestic and international doctoral students. Survey data was collected from 1064 domestic and 120 international students. Model based-clustering analysis was used to classify the students into clusters with more coherent motivational profiles. ANOVA compared the levels of studentsí satisfaction between the clusters. A chi-square test examined if domestic and international doctoral students distributed evenly among the clusters. Surprisingly, students in the cluster with the lowest level of interest in their research work were nonetheless fairly satisfied with their studies; it is significant that students in this cluster also indicated moderate levels of career development motivation for doctoral studies. Contrarily, students with the weakest motivation to extend their career prospects in doctoral studies were less satisfied with their studies than the other students, even though their levels of interest in research were moderate. Significantly more domestic students fell in a cluster which was characterized by the lowest level of motivation to extend their career prospects and the lowest level of satisfaction with their studies. Students who valued their doctoral studies because they believed it would provide better career prospects were more satisfied with their studies. A greater proportion of international students were classified into this cluster. The paper emphasizes positive communications about studentsí career opportunities to expand their view about their future potential.

Structure and Self-Determination: Differences between Two Approaches in Doctoral Education

Quantitative methods,Researcher education,Self-efficacy,Doctoral education,Motivation and emotion

Julia Eberle, Ruhr University Bochum , Germany; Thilo Martius, University of Cologne, Germany; Birgit J. Neuhaus, LMU Munich, Germany;

There are currently two prominent approaches of doctoral education in Europe: the individual doctorate (based on individual agreements between a doctoral student and a supervisor) and a doctorate in structured programs (usually including a course program in addition to the research project and specific regulations). In this study, we examined in a questionnaire study on 593 post-docs in the Life Sciences which effects the type of doctorate had on their experience of competence, autonomy, relatedness to a local work group, and relatedness to the scientific community. We also looked at the effects on researcher self-efficacy, researcher identity, and the aspiration to work in research in the future. The analysis based on structural equation modelling showed either no differences between the two educational approaches or superior effects of the structured approach. We conclude that arguments against structured programs in doctoral education, especially in relation to a lack of autonomy, cannot be supported. However, further research is necessary to investigate the factors that make structured programs successful.

Teacher research involvement: An illusion or a possibility?

Quantitative methods,Researcher education,Secondary education,Inquiry learning

Elena Papanastasiou, University of Nicosia, Cyprus; Yiasemina Karagiorgi, Cyprus Pedagogical Institute, Cyprus;

Teacher involvement in research-related-activities (RRA) is an issue scarcely examined, while information on the nature and frequency of these activities remains limited. In view of the need to develop teachers in Cyprus as research-oriented professionals, and the reported complexities of this endeavor internationally, the current article aims on one hand, to report on Cypriot teachersí involvement in RRA outside the context of requirements of academic studies and on the other, to explore the factors that underlie teacher involvement in RRA, verify the construct validity of these factors and measure the reliability of underlying factor scores. Results indicate that teachers in Cyprus are involved in RRA to some extent only, although they are more actively involved in RRA that do not require active contribution to knowledge construction. On the basis of these findings, the study proceeds to recommendations that will enable the transition towards more research-oriented teachers in the particular context.

E 15

26 August 2015 13:45 - 15:15

Room Blue1_C1

Paper Presentation

Science education

Science education

Keywords: Case studies,Cultural psychology,Misconceptions,Physical Sciences,Secondary education,Argumentation,Reasoning,Science education,E-learning/ Online learning,Learning in context,Qualitative methods,Comprehension of text and graphics,Peer interaction,Reading comprehension

Sig's: SIG 2 - Comprehension of Text and Graphics,SIG 26 - Argumentation, Dialogue and Reasoning

Chairperson: Orit Ben Zvi-Assaraf, Ben Gurion University of the Negev, Israel

When misconceptions can be understood as misunderstandings

Case studies,Cultural psychology,Misconceptions,Physical Sciences,Secondary education

Alaric Kohler, HEP-BEJUNE, University of teacher education, Switzerland;

The aim of this research is to describe situations of misunderstanding in science education. Situations of misunderstanding are understood as communicative situations in which the interlocutors make sense differently, leading them to different interpretations. This research proposes to analyze some commonly known difficulties in learning science as constituting situations of misunderstanding. The methodological and theoretical framework elaborated for the research constitutes an alternative or complementary explanation to the one attributing the cause of the difficulties to the individual learners, and/or to their cognitive abilities. We studied misunderstanding in a high-school context in Switzerland, in laboratory lesson about physics. Over 10 situations of misunderstanding could be identified during a 3 month teaching sequence, among which many explains what usually appears as misconceptions prior to learning in the literature. We conclude from this research that it is more difficult to attribute a given expression or behavior of a learner to an individual conception prior to learning that assumed in science education literature. Some well known misconceptions may be explained as co-constructed misunderstanding.

How laypeople use evidence from science reports in popular news media to make health decisions

Argumentation,Reasoning,Science education,E-learning/ Online learning,Learning in context

Shira Soffer-Vital, Ben Gurion University of the Negev, Israel; Sarit Barzilai, University of Haifa, Israel; Iris Tabak, Ben-Gurion University of the Negev, Israel;

People often base their science-related decisions on scientific information drawn from the Internet. This research is focused on the ways in which laypeople utilize scientific evidence from multiple conflicting online information sources to make health decisions. Specifically, we investigate the ways in which people attend to research methodology and findings and how they interpret evidence. 28 Social Science and Humanities undergraduates were asked to think aloud while reading four documents, adapted from authentic online information sources. The documents reported discrepant results from scientific studies regarding the impact of milk consumption on heart health. Participants were asked to write a letter to a fictitious friend who is contemplating whether to consume dairy products. Participants were asked to analyze the impact of milk consumption on heart health, based on the articles, and recommend whether or not to consume dairy products. Analysis of the letters indicated that about a third of the participants did not refer to research findings in their recommendations. Participants tended to present and elaborate evidence for their own position more than for the counter position. Only a third of the participants reflected critically on evidence quality. Prior knowledge and non-evidentiary claims from the documents were prominent in the recommendations. Thus, our findings suggest that while many laypeople do attend to research findings, they find it difficult to evaluate them and to compare the relevant strength or scientific merit of conflicting findings. This raises questions regarding the contribution of these reports to health decision making.

Reading in science: Reasoning operations while working alone, with peers, or whole-class discussion

Qualitative methods,Comprehension of text and graphics,Peer interaction,Reading comprehension,Science education,Secondary education

Leonard Rivard, Universite de Saint-Boniface, Canada; Ndeye Gueye, Universite de Saint-Boniface, Canada; Margaux Roch-Gagne, Universite de Moncton, Canada;

To fully participate in contemporary society, citizens must possess skills and competencies for making sense of everyday texts. Yet many students have not yet acquired these by the time they complete their secondary studies. Science teachers have an important role to play in preparing students to read and write the kinds of text that are commonplace in science, but studies suggest that they devote very little classroom time to reading texts. Moreover, teachers appear to have difficulty orchestrating instruction in which diverse strategies are effectively combined and aligned while also balancing individual, small-group, and whole-class activities. A three-level reading guide is one approach that teachers can use in the classroom to scaffold studentsí reading of science texts while using different participatory structures to good effect. This paper addressed the question: What reasoning operations are employed when students use a three-level comprehension guide while reading an authentic text (a reading task) and while preparing a guide based on their reading of an authentic text (a writing task), and secondly, how do these operations compare between tasks when students are working alone, in peer groups, or in teacher-led class discussions? Our findings show that participatory structure and task are both important in determining the reasoning operations that students employ when working with texts. Nonetheless, teachers may need support, primarily through professional development opportunities, for effectively using language-based activities in the science classroom.

E 16

26 August 2015 13:45 - 15:15

Room Blue2_D1

Paper Presentation

Social interaction in L&I

Social interaction in L&I

Keywords: Ethnography,Cultural psychology,Social aspects of learning,Social interaction,Primary education,Learning in context,Mixed-method research,Teacher professional development,Environmental education,Cooperative/collaborative learning,Peer interaction,Informal learning,Communities of learners,Case studies,Student learning,Science education,Inquiry learning

Sig's: SIG 10 - Social Interaction in Learning and Instruction

Chairperson: Carmela Aprea, Friedrich-Schiller-University Jena, Germany

From participation to contribution: Learning, teaching and researching in a collaborative classroom

Ethnography,Cultural psychology,Social aspects of learning,Social interaction,Primary education,Learning in context

Judith MacCallum, Murdoch University, Australia; Veronica Morcom, Davallia Primary School, Australia;

In this paper we examine participation processes to develop a collaborative primary school classroom in which all students had opportunities to contribute to transforming classroom practices. It is informed by Stetsenkoís reconstruction of Vygotskian sociocultural concepts, proposing a transformative activist stance perspective, which defines learning as ìcontributing to collaborative practices of humanityî rather than as merely participating in those practices. The teacher has an active role and in terms of Valsinerís notion of ëcanalizationí, the teacher channels a studentís activities in certain ways so that development is organised in a particular direction, consistent with the teacherís goals and values. A year-long ethnographic study in a Year 3 classroom was used to understand how a teacher channels student participation to create a collaborative classroom and what changes in participatory roles and contribution are possible. The teacher developed a range of participatory opportunities, including social circles and class meetings, which provided a means for all students to participate in authentic decision-making and collective action. Thirty hours of recorded class meeting and group interactions were analysed qualitatively using fine-grained micro level analysis method (Kovalainen & Kumpulainen). The paper discusses the range of communicative functions used in different

activities, the changing participatory roles and resultant action and the changing role of the teacher over the year. The research highlights ways that a skilful teacher can guide and direct student participation and action, so that the students understand how they contribute to transforming collaborative practices that have currency beyond the classroom.

Autonomy as a condition for a joint implementation of innovation at school: A mixed method approach

Mixed-method research,Teacher professional development,Social interaction,Environmental education,Primary education,Cooperative/collaborative learning

Stefanie Morgenroth, Bergische University Wuppertal, Germany;

During the course of their working lives, German teachers are repeatedly confronted with new challenges. In addition to changing characteristics of the student body, innovations in school organization and curricula, for example, require a continuous advancement of professional knowledge and behavioral adaptation of teachers. Although intensive teacher cooperation is considered as an important element to support innovation transfer it is not actively supported by German teachers. The reason most studies in educational research mention for the lack of intensive cooperation in Germany is the autonomy-parity-principle. This represents the principles and values of schools in Germany which include isolation and a lack of interaction between teachers. Although a certain level of autonomy is helpful for cooperation, there is little known about autonomy as a condition resource for intensive teacher cooperation. Therefore, there is a need to support intensive teacher cooperation by means of the analysis of autonomy as a condition resource for intensive teacher cooperation. In this article, we present the theoretical background, methods and results of a study with a mixed-method design analyzing autonomy and the willingness of interaction as condition resources for intensive cooperation within a structural equation model. With the help of the qualitative analysis we aim at answering the question how teachers maintain their autonomy despite intensive cooperation. Finally, we discuss implications for further research and practice at school (in particular with regard to the role of school management).

Core and periphery in learning communities: Do they value experienced participation differently?

Mixed-method research,Peer interaction,Social aspects of learning,Informal learning,Communities of learners,Learning in context

Filitsa Dingyloudi, Ludwig-Maximilians-Universitat (LMU), Germany; Aikaterini Vasilaki, Ludwig-Maximilians-University, Germany; Jan-Willem Strijbos, Ludwig-Maximilians-Universitat (LMU), Germany;

This study explores the relationship between community membersí network positioning (i.e., core and peripheral members) and the values attributed by these members to their experienced participation in a Community of Learning Practice (CoLP) in higher education. Participants (N = 18) were international graduate students of a study program in the Learning Sciences. They

participated voluntarily in the extra-curricular community in parallel to their study program. Data were collected with (a) social network questionnaires (participantsí personal relationships with other community members), and (b) written personal narratives (values attributed to their experienced community participation). Community membersí social network positioning was identified by degree centrality. The values that community members attributed to their experienced participation were explored through content analysis of their written personal narratives with a theory-driven situated multilevel typology of values. Findings revealed that membersí social network positioning within the CoLP was not a differentiating factor in membersí attribution of values to their experienced participation, since there was no significant difference in the types of values reported by core and peripheral community members. The findings imply that either the community shaped core and peripheral membersí experienced participation in a similar way ñ due to its focus on fostering academic skills through social interaction that implied a sense of community ñ or that members common needs deriving from the wider context (i.e., the study program) were successfully addressed through community participation.

Academically weak students in computer supported inquiry learning: A case study

Case studies,Student learning,Social aspects of learning,Science education,Primary education,Inquiry learning

Vassilis Kollias, University of Thessaly, Greece;

In this work we focus on the affordances and obstacles for aceademically weak students as they participate in computer supported inquiry learning. Our data refer to a group of three 5th grade students comprised by an academically strong student and two academically weak peers. In the process of 14 lessons the academically weak students focus on the information in the software and through this acquire a valuabel role for themselves and contribute to the group work. Through such a process they may achieve a status of "admired marginals" (according to the MARGINI model (Ellemers & Jetten 2012)). However their further progress to socialized nmarginals is perilus. We report indications that the social and managerial skills of the academicaaly strong student and the challenging and engaging structure of the task could contribute to this transition.

E 17

26 August 2015 13:45 - 15:15

Room Brown_B8

Paper Presentation

Teacher professional development

Teacher professional development

Keywords: Content analysis,Mixed-method research,Pre-service teacher education,Teacher professional development,Developmental processes,Higher education,Qualitative methods,Quantitative methods,Video analysis,Self-efficacy,Professions and applied sciences,Motivation and emotion,Metacognition,Learning in context

Sig's: SIG 11 - Teaching and Teacher Education

Chairperson: Jori Beck, University of Nevada, Las Vegas, United States

Developmental tasks for teacher trainees - Identification of requirements during practical training

Content analysis,Mixed-method research,Pre-service teacher education,Teacher professional development,Developmental processes,Higher education

Ozlem Altin, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland;
Julia Kosinar, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland;
Sabine Leineweber, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland;

Future primary teachers complete four phases of practical training during their studies at the School of Teacher Education FHNW. These follow various developmental objectives which have to be dealt with. The study "Requirements for teacher trainees during practical training" (2014-2017) examines the individual perception of demands and their description by students at the end of each placement. The data was collected through guided interviews (N=36) and was categorically analysed in an inductive procedure (Bohm 2004). This is how, for the first time, a compilation of requirements for practical training emerged. Subsequently, a questionnaire was developed and will be conducted in Spring 2015. Demands of profession entry (Keller-Schneider 2010, Hericks 2006) or types of coping with demands in pre-service (Kosinar 2014) have already been identified. For career entry there is an empirically proved canon of models in professional developmental tasks. They relate to finding a professional identity in the role of teacher, in the demands of teaching and in classroom management as well as in cooperation with other protagonists in the school system (Keller-Schneider/Hericks 2011). Our results show a possible compatibility of demands in these four domains. However, they are specific for the training phase and some demands are to be ascribed to a fifth domain, namely "undergoing a training situation". In our contribution, the identified requirements will be illustrated by concrete data and the model of developmental tasks as well as the set-up of the questionnaire survey will be presented.

Pre-service teachersí capacity to teach self-regulated learning: Analysis of videotaped lessons

Mixed-method research,Qualitative methods,Quantitative methods,Video analysis,Pre-service teacher education

Tova Michalsky, Bar-Ilan University, Israel;

The study focused on central question: how do teachers acquire the necessary expertise to positively develop students' self-regulated learning (SRL)? The goal of this study to explore the value of systematic reflection on students' classroom behaviors during the practicum phase in science teacher preparatory programs, as a complementary approach to the more traditional approach of systematically reflecting on teachers' classroom behavior. In the proposed research, both reflective approaches ñ learning from students' behaviors (LFSB) and learning from teachers behaviorsí (LFTB) ñ are conceptualized as professional vision (PV) processes, in which preservice teachers learn by evaluating, interpreting, and explaining significant key features of classroom events. The study examined the differential contribution of these two reflective approaches (learning from teacher behaviors ñLFTB; learning from teachers and students behaviors- LFTB+ LFSB) to the dependent variables ñ teachers' SRL professional vision and actual teaching of SRL. The results indicated that learning from teachers and students behaviors-LFTB+ LFSB improved more preservice teachersí professional vision and actual teaching of SRL strategies, compared to the control groups-LFTB. The study offers an important contribution to pre-service teacher training, focusing on improving teachers' SRL professional vision process (noticing/describing/explaining/predicting) and teaching SRL strategies.

Teachersí professional well-being risk factors: a mixed method study in VET

Mixed-method research,Teacher professional development,Self-efficacy,Professions and applied sciences,Motivation and emotion

Viviana Sappa, Swiss Federal Institute for Vocational Education and Training (SFIVET), Switzerland; Elena Boldrini, Swiss Federal Institute for Vocational Education and Training, Switzerland; Carmela Aprea, Friedrich-Schiller-University Jena, Germany;

An extensive research literature has been currently developed to investigate protective and risk factors which contribute to foster or hinder professional well-being of different kinds of teachers. However, there is a shortage of studies dealing with vocational education and training (VET) teachers. To fill this gap, a large scale research project has been launched in 2012 to explore threatening challenges and protective resources among VET teachers in Switzerland. In this paper, preliminary results are presented specifically concerning VET teachersí perceived risk factors and their effect on professional well-being. A quali-quantitative mixed design was applied by combining in a sequential way an interview study and a questionnaire study. In total 37 and 604 Swiss VET teachers were involved respectively in the qualitative and quantitative phase of the study. Inductive content analysis was applied to identify a repertory of qualitative categories of perceived risk factors to be transformed in questionnaire items. Explorative factorial analysis were used to reduce risk factors variables into a restricted set of dimensions, while Structural Equation Modeling procedures were employed to test the effect of each dimension on professional well-being variables (job satisfaction, professional engagement, sense of competence, sense of efficacy to face with professional challenges). Preliminary findings showed professional well-being to be negatively affected by classroom-related challenges, by school-related challenges and by difficulties in work-life balancing and time managing. Macro-system and role-related challenges appeared to contribute only indirectly to threat professional well-being. Further findings will be presented and discussed at the conference also in relation to their implications for VET teachers training.

Fostering adaptive expertise in school leaders and teachers: The practice of effective facilitators

Qualitative methods,Teacher professional development,Metacognition,Learning in context

Fiona Ell, University of Auckland, New Zealand; Deidre Le Fevre, University of Auckland, New Zealand; Helen Timperley, The University of Auckland, New Zealand; Katherine (Kaye) Twyford, University of Auckland, New Zealand;

Adaptive expertise is a promising way to characterise and understand teacher practice that is highly reflective, responsive and innovative. Such practice is necessary to reduce inequity in education systems. This qualitative study closely examines the practice of six effective facilitators as they work with school leaders and teachers to develop their adaptive expertise. A data set comprising transcripts of interactions between facilitators and school leaders, annotated by facilitators with commentary on their thinking, and extended interviews with both facilitators and the leaders they worked with was analysed to look for commonalities in the practice of developing adaptive expertise. Both intrapersonal and interpersonal factors were found to be important, with sophisticated metacognition and reflection being essential to facilitatorsí practice. Deep conceptual knowledge was combined with particular ways of working to bring about change. Identifying ways in which effective facilitators develop adaptive expertise in school leaders allows us to better prepare facilitators for this work, which has the potential to be a strong influence on school change and thus improved outcomes for learners.

E 18

26 August 2015 13:45 - 15:15

Room Brown_B3

Paper Presentation

Teacher professional development

Teacher professional development

Keywords: Qualitative methods,Teacher professional development,Developmental processes,Reflection,Higher education,Lifelong learning,Quantitative methods,Pre-service teacher education,Metacognition,Social interaction,Interdisciplinary,Design based research,Numeracy,Primary education,Secondary education,Communities of practice

Sig's: SIG 11 - Teaching and Teacher Education,SIG 14 - Learning and Professional Development,SIG 4 - Higher Education

Chairperson: Sigrid Blomeke, University of Oslo, Norway

Analysis of university teachersí needs for individual and organizational professional development

Qualitative methods,Teacher professional development,Developmental processes,Reflection,Higher education,Lifelong learning

Anna Serbati, University of Padova, Italy; Ettore Felisatti, University of Padova , Italy;

The paper is part of a wider study (PRODID project) for academic teachersí professional development and presents the results of a need analysis among professors at the University of Padova, carried out in order to plan successful training actions to support teachersí in developing new pedagogical thinking and reflection. Three dimensions to improve instructional quality with an integrated approach are considered: faculty, institutional and organisational levels. For each of them, a description of emerging categories is proposed, together with the training actions that the Research Group is implementing to answer the needs. The challenge addressed by the training actions is to support teachers in developing reflection on their teaching practices and to re-think and re-design these from a student-centered perspective.

Once a good judge, always a good judge? On the stability of pre-service teachersí judgment accuracy

Quantitative methods,Pre-service teacher education,Teacher professional development,Metacognition,Social interaction,Interdisciplinary

Caroline Verena Wahle, University of Koblenz-Landau, Germany; Anna-Katharina Praetorius, German Institute for International Educational Research (DIPF), Germany; Katrin Hochdoerffer, University of Koblenz-Landau, Germany; Friedrich-Wilhelm Schrader, Universitat Koblenz-Landau, Germany;

Teachersí judgment accuracy is assumed to be a prerequisite for successful adaptive teaching (Corno & Snow, 1986). However, previous research indicated considerable differences regarding judgment accuracy among teachers (e.g. Sudkamp, Kaiser & Moller, 2012). It is thus often assumed that some teachers are good judges and others are not. Studies investigating whether or not teachersí judgment accuracy is a stable construct were conducted in natural classroom settings, where some student characteristics will have been subject to change between measurement points. Investigating the stability of judgments presupposes, however, that the judged characteristic and the information the judge has about the targets do not change over time; otherwise, judgments of different measurement points are based on variable information and thus cannot be compared unambiguously. The present study is a first attempt in this direction by controlling for factors that may influence judgment stability in natural classroom settings. Targets were 218 students in 10th grade of grammar and middle schools in Germany. We investigated 26 (measurement point one) and 22 (measurement point one) pre-service teachers as judges. Studentsí self-concept in physics and metacognitive experiences were judged twice within three months. At measurement point one, the pre-service teachersí ratings of studentsí variables took place subsequent to a 90 minute interaction with the students. At measurement point two, the lesson video was provided for orientation. Between the measurement points, no

further interaction between judges and targets took place. Findings indicate that rather stable variables (e.g. studentsí self-concept) result in both higher judgment accuracy and stability.

A change laboratory to foster a professional learning network (the CCCM project)

Design based research,Teacher professional development,Numeracy,Primary education,Secondary education,Communities of practice

Alain Breuleux, McGill University, Canada; Gyeong Mi Heo, McGill University, Canada; Lei Nong, McGill University, Canada;

This paper presents a change laboratory conducted in the initial phase of a 3-year project to foster a professional learning network (PLN) for elementary and secondary school teachers concerned with digital literacy and studentsí success in mathematics. Through the change lab process, we identified two initial contradictions driving the change process: a) between perceived instructional success and evidence of instructional shortcomings and b) between technology as an enabler and technology as a distractor. Furthermore, in attempts to move out of these contradictions, two ìsecond stimuliî are revealed. The first one is the ìflipped classroomî (Bergmann & Sams, 2012) a complex object that emerged from the sense-making conversations between researchers and consultants. The second, equally complex, stimulus is the lesson study process (Hart et al., 2010), also emerging from discussions within the leadership team. The paper illustrates how formative interventions and especially the change laboratory can be useful in educational contexts and research challenges such as the development of a PLN for digital competence and mathematical understanding in elementary and secondary classrooms.

E 19

26 August 2015 13:45 - 15:15

Room Blue2_D2

Paper Presentation

Technology integration

Technology integration

Keywords: Educational technology,Workplace learning,Game-based learning,Motivation and emotion,Mixed-method research,In-service teacher education,Pre-service teacher education,Biology ,Secondary education,Case studies,Reflection,Technology,Higher education,Learning in context,Quantitative methods,Teaching/instruction

Sig's: SIG 11 - Teaching and Teacher Education,SIG 7 - Learning and Instruction with Computers,SIG 8 - Motivation and Emotion

Chairperson: Charoula Angeli-Valanides, University of Cyprus, Cyprus

Psychological need satisfaction via gamification

Educational technology,Workplace learning,Game-based learning,Motivation and emotion

Michael Sailer, Ludwig-Maximilians-Universitat (LMU), Germany; Heinz Mandl, Ludwig-Maximilians-Universitat (LMU), Germany;

Gamification is the new kid on the block in the area of game-based environments. The idea of gamification concepts is to use game design elements in a non-game context to enhance motivation and learning. The goal of this study is to investigate the motivating power of gamification and to fill the empirical and theoretical gap regarding psychological research on gamification. To do so, a self-determination theory perspective is applied. Effects of game design elements like points, badges or stories on basic psychological needs for competence, autonomy and social relatedness are investigated. An experimental control group design was conducted in the context of intralogistics. Hereby trainings of new and untrained workforce was gamified within an artificial storage depot setting and compared to a traditional instructional design setting. Results show positive effects of a gamification training environment compared to a traditional direct instruction training environment regarding the feeling of competence, autonomy and relatedness. This study shows that basic psychological needs, which relate to intrinsic motivation, can be fulfilled by implementing game design elements in non-game context within barely stimulating working and learning contexts like intralogistics.

Just-in-time support for teachersí technology-infused lesson planning

Mixed-method research,Educational technology,In-service teacher education,Pre-service teacher education,Biology ,Secondary education

Noortje Janssen, University of Twente, Netherlands; Ard Lazonder, University of Twente, Netherlands;

Teachers need support when integrating innovative technologies in their lessons. In this research, two types of just-in-time support for lesson planning were compared on perceived usefulness and effectiveness. Both types contained the same technological information but differed regarding pedagogical and content information. The first type of support presented this information elaborately and separately (i.e., separate support); the second type presented this information in a compact and integrated fashion (i.e., integrated support). Study 1 asked high school biology teachers (23 pre-service, 23 in-service) which type of support they would prefer. As expected, most in-service teachers chose the integrated support. However, most pre-service teachers also preferred this support, and argued that it could assist them in integrating pedagogy and content. Study 2 examined whether this conjecture holds true by comparing the lesson plans created by pre-service teachers who received either the separate (n = 27) or integrated support materials (n = 26). Results showed that pre-service teachers who used the integrated support had more integrated pedagogical and content-related justifications in their lesson plans than the group who received separate support. Both groups had few technology-related justifications. These findings confirm the alleged superiority of integrated support over separate support, and demonstrate that

additional guidance is needed to help pre-service teachers to fully integrate pedagogical, technological and content information during lesson planning.

Using Videopapers to support the process of reflection in the context of teacher education

Case studies,Pre-service teacher education,Reflection,Technology,Higher education,Learning in context

Maria Daniil, Cyprus Ministry of Education and Culture, Cyprus;

A wealth of studies address the role of reflection in encouraging pre-service and in-service teachers to identify and understand the different layers of complexity associated with teaching. This paper reports an exploratory, qualitative case study which investigated the process of reflection through the use of the video annotation tool, called Videopaper, in the context of teacher education. The study involved two cohorts of student teachers who engaged in the structured tasks of video-recording a lesson, reading previously created Videopapers by other student teachers, editing the video-recorded lesson and creating their own Videopaper to reflect on teaching practice. Various data collection methods such as observations, individual and group interviewing, focus groups, videoing and material collection were employed. A thematic analysis approach consisting of deductive and deductive steps was used for the analysis of the data. Drawing on the framework of reflection - devised by the researcher - evidence of reflection was identified both in the process of engaging in the various tasks and in the content of the Videopapers the student teachers created. The findings revealed that the structured tasks the student teachers engaged in (video-recording a lesson, reading Videopapers, editing the video-recorded lesson and creating a Videopaper) enabled them to inquire into their teaching, step back and notice their practice. This process facilitated the reflection process since it supported the student teachers to reflect in a structured way and become more analytical and critical upon their teaching practice.

Mining a system: The use of data mining and system dynamics to explore technology integration

Quantitative methods,Educational technology,Teaching/instruction,Secondary education

Sarah Howard, University of Wollongong, Australia; Jun Ma, University of Wollongong, Australia; Jie Yang, University of Wollongong, Australia; Kate Thompson, University of Sydney, Australia;

Technological innovation in schools has, as yet, resulted in relatively limited teacher and student engagement with new ways of learning supported through information and communication technologies (ICTs). One of the possible reasons for this is that educational research has struggled to grasp the complexity or dynamic nature of technology integration. This paper presents a combined approach of system dynamics and data mining to understand some of the complexity and dynamics of technology integration. Using a theoretical system model of technology integration, we present the application of data mining techniques to discover rules and patterns of that system. Specifically, the analysis explores studentsí perceptions of

technology integration, as a are key component of teachersí decisions to use technology in the classroom. The analysis draws on 2012 student questionnaire data from the evaluation of a large-scale one-to-one laptop program in Australia. Early results demonstrate two patterns of interest in the data: 1) approximately 20% of students report low ICT engagement and 2) 10-30% report negative beliefs about learning with technology, across all levels of ICT efficacy. Findings suggest a significant portion of students are not interested in, or benefiting from, use of ICTs in learning. The next steps in this research will be to investigate rules and behaviours among other factors to create predictive models of technology integration. The research is innovative in its use of data mining techniques to create a predictive system model to better understand technology integration in teaching and learning. Implications for further research will be discussed.

E 20

26 August 2015 13:45 - 15:15

Room Purple_H2

Paper Presentation

Writing

Writing

Keywords: Instructional design,Language (Foreign and second),Writing/Literacy,Higher education,Action research,Comparative studies,Content analysis,Design based research,Experimental studies,Cognitive skills,Self-regulation,Primary education,Student learning,Argumentation,Literacy

Sig's: SIG 12 - Writing,SIG 26 - Argumentation, Dialogue and Reasoning

Chairperson: Debra Myhill, University of Exeter, United Kingdom

Interactive instructional video for L2 writing in higher education: The impact on student learning

Instructional design,Language (Foreign and second),Writing/Literacy,Higher education

Elke Van Steendam, KU Leuven, Belgium; Luc De Grez, KU Leuven campus Brussels, Belgium; Katie Goeman, KU Leuven, Belgium; amanda frawley, KULeuven, Belgium;

The majority of studies on observational learning in writing use videos in which expert and/or peer models demonstrate the use of writing strategies (Rijlaarsdam et al., 2008). Ideally, these videos are based on Banduraís social cognitive theory (Bandura, 1997), according to which learning is governed by four processes: attention, retention, production and motivation. However, more research is needed to determine the ëidealí match of attention-triggering, retention-enhancing and motivational cues in instructional video for higher education writing

instruction in combination with design principles for effective video. From research on video design interactivity emerges as one of the key components. In this semi-experimental pre-test post-test design study we scrutinize the impact of interactivity in instructional video in combination with key tenets of observational learning. Sixty university freshmen of Applied Linguistics were randomly assigned to two experimental conditions. In a Non-interactive Video Condition students observed a video in which a peer tutor discussed an undergraduateís essay. In an Interactive Video Condition, students watched the same video but were also asked questions to enhance attention and improve retention of the modelled strategies. Studentsí self-regulation strategies (1), self-efficacy beliefs (2) and satisfaction with the video (3) were measured in addition to their retention of criteria for effective argumentative essay writing (4) and their revision skills (5). Preliminary analyses show no significant differences between the conditions with regard to studentsí self-regulation and self-efficacy. The Interactive-Video condition students, however, seemed to have remembered criteria for planning and structuring argumentative essays much better.

One phonic method is not the other: Efficacy of two phonic treatments

Action research,Comparative studies,Content analysis,Design based research

Marie Van Reybroeck, Universite catholique de Louvain (UCL), Belgium; Aliette Lochy, Universite catholique de Louvain, Belgium; Alain Content, Universite Libre de Bruxelles, Belgium; Bruno Rossion, Universite catholique de Louvain, Belgium;

It is well established that initial programs for elementary reading have to include a strong emphasis on phonics and phonemic awareness. However, small effects of phonics teaching are observed on first graders. It is therefore critical to further question the determinant features of teaching methods. According to the cognitive processes involved in long-term memory, the present study aims to assess the efficacy of a phonic method offering a meaningful support for early learning to read, in comparison to a simple phonic method. Over a period of 2 months, three groups of 15, 14, and 14 kindergarten children (aged 5-6 years) received respectively, a meaningful phonic treatment, a simple phonic treatment or a control treatment. In the meaningful phonic treatment, children were trained with ìLa Planete des Alphasî, a set of learning supports based on a storybook and card games in which each character sings a different phoneme and looks like the corresponding grapheme. The treatment was composed of card games with the characters in the meaningful treatment or with standard graphemes in the simple phonic treatment. Children were assessed at pretest and posttest with control measures and experimental measures such as reading. Results showed that children from the meaningful phonic treatment learnt more correspondences in comparison to children from control and simple phonic treatments. They also improved more their phonological awareness performances and word reading performances. These findings have a clear practical implication for teachersí instructional practices at schools and also for our understanding of the early reading acquisition.

Examining the effects of a writing intervention targeting transcription plus self-regulation

Experimental studies,Instructional design,Cognitive skills,Self-regulation,Writing/Literacy,Primary education

Teresa Limpo, University of Porto, Portugal; Rui Alexandre Alves, University of Porto, Portugal;

Writing proficiency is heavily based on the acquisition and development of transcription and self-regulation skills (Limpo & Alves, 2013). The present study examined the effects of a multicomponent writing intervention combining transcription and self-regulation training in Grade 2 (age 7-8). The study involved a pretest-posttest quasi-experimental design, in which four classes were randomly assigned to an intervention group (N = 43) or a control group (N = 39). In each of the 10 weeks of the intervention, students received one 60-min self-regulation lesson followed by three 20-min transcription lessons. The transcription component aimed to promote fast and accurate handwriting and spelling. The self-regulation component followed the Self-Regulated Strategy Development model (Harris & Graham, 2009) to teach a story-specific planning strategy plus self-regulation procedures. Control students received the standard language arts curriculum. Compared to control students, intervention students (a) produced more sophisticated plans, showed greater handwriting fluency, and correctly spelled more inconsistent words; (b) wrote texts with more words that were rated of better quality; (c) produced more complete stories, composed of longer clauses; (d) were able to write longer bursts (i.e., number of words in-between two pauses longer than 2 s); and (e) included more story elements in a written recall of a story orally presented. This pattern of findings suggests that very young children benefit from multicomponent writing interventions targeting transcription in tandem with self-regulation.

Enhancing students' written argumentation through Quality Talk

Student learning,Argumentation,Literacy,Writing/Literacy,Primary education

Carla Firetto, The Pennsylvania State University, United States; P. Karen Murphy, The Pennsylvania State University, United States; Jeff Greene, University of North Carolina, United States; Mengyi Li, The Pennsylvania State University, United States; Liwei Wei, PSU, United States;

A considerable number of approaches in the existing literature on text-based discussions have shown increases in student talk, yet few have demonstrated concomitant increases in studentsí high-level comprehension of text (i.e., critical-analytic thinking and epistemic cognition. Quality Talk (QT) is an approach to conducting discussions that promotes studentsí high-level comprehension of text, as evidenced through critical-analytic thinking and epistemic cognition. By explicitly teaching students to construct arguments and critically evaluate the reasons and evidence presented in those arguments (i.e., critical-analytic thinking and epistemic cognition) and facilitating studentsí use of argumentation in QT discussions, we believe that QT can foster high-level comprehension of texts that will be evidenced in studentsí writing. This study employed a single group time-series design with 35 student participants. At each time point, students had small-group discussions and responded to an argumentation question that corresponded with the weekly reading selection. Multilevel modeling was used to analyze the change in studentsí argumentation over time. On average, studentsí argumentation score increased .1 points over ten time points. These data suggest that students who participated in Quality Talk responded to written argumentation prompts with significantly increasing success

over time, evidencing greater critical-analytic thinking and reasoning characterized by epistemic cognition.

E 21

26 August 2015 13:45 - 15:15

Room Brown_B6

Paper Presentation

Assessment methods and tools

Assessment methods and tools and higher education

Keywords: Quantitative methods,Teacher professional development,Competencies,Reading comprehension,Primary education,Mixed-method research,Assessment methods and tools,Pre-service teacher education,Mathematics,Higher education,Teaching/instruction,Learning and developmental difficulties,Student learning,Emotion and affect,Social sciences,Motivation and emotion

Sig's: SIG 1 - Assessment and Evaluation,SIG 11 - Teaching and Teacher Education,SIG 8 - Motivation and Emotion

Chairperson: Anique de Bruin, Maastricht University, Netherlands

Components of teacher judgment accuracy: Relations, stability, and influence on student learning

Quantitative methods,Teacher professional development,Competencies,Reading comprehension,Primary education

Natalie Foerster, University of Munster, Germany; Elmar Souvignier, University of Muenster, Germany;

The present study investigates a) the accuracy of teachersí judgments on studentsí reading fluency and reading comprehension, b) the correlations between different aspects of teacher judgment accuracy, c) the stability of these different aspects, and d) whether there is a relationship between teachersí judgment accuracy and the development of studentsí reading achievement. Reading fluency and reading comprehension was assessed at the beginning and at the end of the school year from 2517 third and fourth grade students with two standardized reading tests, and 110 teachers were asked to rate their studentsí performance. Three aspects of teacher judgment accuracy were analyzed: correlations between judges and performance (rank order component), the difference between judges and performance (level component), and the quotient of judgment of variance and performance variance (deviation component). Results indicate that teachersí judges were highly correlated with student performance but that teachersí

judges of reading level and reading variance lacked accuracy. Overall, most correlations between different aspects of teacher judgment accuracy and between different measurement points were not significant, providing no evidence for a general ability to make accurate judgments. No direct influence of teacher judgment accuracy on student learning was found.

Matching mathematical tasks and teaching objectives

Mixed-method research,Assessment methods and tools,Pre-service teacher education,Mathematics,Higher education

Hodaya Hoch, Talpiot & Orot Israel Colleges, Israel; Miriam Amitt, Ben-Gurion University of the Negev, Israel;

Responsibility for assessment is being transferred to teachers so that they can critique their own work and follow each student's progress. In order to succeed in this assignment, teachers must build reliable assessment tools. This study examines the ability of 32 pre-service and 34 novice mathematics teachers in secondary school to do so via a questionnaire. Each question requires them to find the most suitable objective behind a given task or to find the most suitable task that has the potential to assess a given objective. The results show problems in that matching for both kinds of questions. Eight participants who were interviewed gave a better understanding of the participants' way of thinking. Analysis of the interviews reveals some of the reasons for the lack of success which can be divided into four main categories: A. Problems in Content Knowledge, B. Problems in Pedagogical Knowledge i.e. how to determine an objective, C. Impact of Presumptions or Beliefs and D. Technical problems.

Growth trajectories for mathematical competencies

Quantitative methods,Teaching/instruction,Learning and developmental difficulties,Mathematics

Nina Zeuch, University of Muenster, Germany; Elmar Souvignier, University of Muenster, Germany; Natalie Foerster, University of Munster, Germany; Birgit Harks, University of Munster, Germany;

Knowledge about growth trajectories of primary studentsí mathematical competencies helps teachers to identify students at risk and to adapt instruction to studentsí needs. Only few studies, however, investigate growth trajectories for different mathematical competencies in primary school. As computation and number sense are central competencies in early mathematics instruction, the present study investigates (1) whether computation and number sense increase in the course of the second grade and (2) whether studentsí growth in both competencies differs between individuals. Furthermore, (3) growth trajectory groups for computation and number sense are analysed. A total of 414 second grade students were tested individually with a web-based progress monitoring tool every three weeks (eight measurement times). Four parallel test versions were developed with each version being administered twice. In each test number sense was assessed with 24 items (average Cronbachís ? = 0.85) and computational competence with 28 items (average Cronbachís ? = 0.86). Results of latent growth curve models and latent class growth analyses show that (1) on average, number sense and computational competence increase

during the second school year. (2) The development of both competencies, however, varies between individuals. (3) For number sense and computation, there are students having no increase during the whole year, whereas others show a positive (non-compensatory) or even positive compensatory development (i.e., initially relatively less-skilled students show higher growth rates than initially higher-skilled children). These different growth trajectories can be found for students with low, medium, or high initial performance.

Individual and academic environmental antecedents of teacher education studentsí study satisfaction

Quantitative methods,Student learning,Emotion and affect,Social sciences,Higher education,Motivation and emotion

Michaela Glaeser-Zikuda, University of Erlangen-Nuremberg, Germany; Gerda Hagenauer, University of Bern, Switzerland; Barbara Moschner, Universitat Oldenburg, Germany; Andrea Bernholt, IPN Kiel, Germany; Nina Kim Dunker, University of Chemnitz, Germany; Susi Klass, University of Erlangen-Nuremberg, Germany; Iris Lueschen, University of Oldenburg, Germany; Nicole Wolf, University of Erlangen-Nuremberg, Germany;

Based on a sample of 792 German teacher education students from five different universities, an interrogation study was carried out to analyze predictors of studentsí study satisfaction focusing on a selected range of individual and academic environmental factors. Regarding to the conceptualization of Westermann et al. (1996), study satisfaction was analyzed as a three-factor construct: satisfaction with the learning content, satisfaction with the study conditions, and satisfaction with oneís ability to copy with study related stress. The results of hierarchical regression analysis show that different predictors contribute with a different extent to the explanation of the three indicators of study satisfaction. Factors of the learning environment, in particular the quality of the theory-practice link, as well as factors of the individual learner (e.g. a high mastery orientation) explain studentsí satisfaction with the learning content best. Studentsí satisfaction with the study conditions is best predicted by institutional environmental conditions, such as the study feasibility. Besides, teaching quality (theory-practice link and transparency of grading) is a significant predictor, as well. Studentsí satisfaction with the own ability to cope with study related stress is particularly affected by the level of study demands. Students also report on higher satisfaction in this dimension if the perceived autonomy in their studies (e.g., in terms of placing individual emphasis on different content areas) was higher. The results of the study will be discussed with regard to previous research on study satisfaction in higher education, as well as with regard to studies on the quality of teacher education.

E 22

26 August 2015 13:45 - 15:15

Room Orange_E1

Paper Presentation

Mathematics education

Mathematics education and educational policy and SRL

Keywords: Qualitative methods,Video analysis,Teaching/instruction,Mathematics,Primary education,Quantitative methods,Educational policy,Achievement,Educational attainment,Interdisciplinary,Secondary education,Student learning,Attitudes and beliefs,Cognitive skills,Problem solving,Mixed-method research,Pre-service teacher education,Metacognition,Self-regulation

Sig's: SIG 11 - Teaching and Teacher Education,SIG 16 - Metacognition,SIG 18 - Educational Effectiveness

Chairperson: Angelika Kullberg, Goteborg University, Sweden

From curriculum developers to teachersí enactment of mathematical tasks: A broken telephone game?

Qualitative methods,Video analysis,Teaching/instruction,Mathematics,Primary education

Charalambos Charalambous, University of Cyprus, Cyprus; Kassandra Georgiou, University of Cyprus, Cyprus; Marina Kenti, University of Cyprus, Cyprus;

During the past three decades educational research has systematically shown that mathematical tasks play a pivotal role in what students learn. Cognitively demanding tasks, in particular, have been found to promote mathematical reasoning and high-level thinking. Therefore, such tasks have made their way into the mathematics curricula of different countries. Following international trends, during the last four years, the Cypriot mathematics curricula have been revamped to reflect this emphasis on cognitively demanding tasks. These efforts notwithstanding, the question remains: what type of mathematics do students experience in mathematics classrooms? Capitalizing on the fact that in Cyprus there is a centralized educational system and only one textbook is in use, in this exploratory study, we trace the development and unfolding of tasks taught in second and third gradeótwo of the four grades in which the curricula have been or are currently reformed. Drawing on a rich corpus of data including interviews with curriculum developers/textbook authors, analysis of the cognitive demand of the curriculum tasks, and analysis of videotaped lessons in which the new textbooks have been enacted, we found that, although significant steps have been made in uplifting the quality of mathematics offered to students, curriculum developersí intentions are not always materialized. We conclude by offering suggestions as to how the intended curriculum, as conceptualized by curriculum developers, could align with the enacted curriculum and the curriculum experienced by students.

Effectiveness of a uniform integration system for delivering national curriculum: Chileís experience

Quantitative methods,Educational policy,Achievement,Educational attainment,Interdisciplinary,Secondary education

Miguel Nussbaum, Pontificia Universidad Catolica de Chile, Chile; Magdalena Claro, Pontificia Universidad Catolica de Chile, Chile; Raimundo Frohlich, Pontificia Universidad Catolica de Chile, Chile;

By analyzing Chile as a case study, this paper shows how studying the relationship between studentsí curricular age (i.e. the knowledge and skills they have effectively acquired) and their actual grade level, reveals the extent to which education systems are effective in delivering a standard curriculum to a heterogeneous student population. Data from the Chilean national standardized test for 8th grade Mathematics from 2011 was analyzed for 183,243 students and showed that in Chile only 1 in 4 students from 8th grade were at the expected curricular level in Mathematics and 64% of students had not mastered any of the grade levels evaluated by the test. The study also revealed that 66.3% of the students who do not reach the expected level in 4th grade fail to do so in 8th grade. These results unveil that in Chile, the pace of learning required by the curriculum is not appropriate for the majority of students and that it is necessary that the educational system addresses studentsí diversity.

What influences post-performance judgments in elementary school? Evidence from mathematical problems

Student learning,Achievement,Attitudes and beliefs,Cognitive skills,Problem solving,Primary education

Trinidad Garcia, University of Oviedo, Spain; Evelyn Kroesbergen, University of Utrecht, Netherlands; Celestino Rodriguez, University of Oviedo, Spain; Julio Antonio Gonzalez-Pienda, University of Oviedo, Spain; Paloma Gonzalez-Castro, University of Oviedo, Spain;

Studentsí ability to make accurate performance judgments (or calibration) has aroused great interest in the last decades. Calibration is intimately linked to learning and performance in mathematics and problem-solving. However, research suggests that students are commonly low calibrated, and over-confident. This study analyzed the impact of three sets of factors on studentsí performance judgments accuracy after completing two mathematical problems. The studied variables were: domain-general variables (executive functions); domain-specific variables (affective-motivational variables related to mathematics, and achievement in the subject); and tasks characteristics (perceived difficulty, and time spent on the task). 188 fifth and sixth grade students took part in the study, divided into two groups as function of their judgments accuracy (accurate = 79; inaccurate = 109). Differences between groups in these variables were examined, as well as their discriminatory value predicting group membership. The possible effect of age, gender and grade level, was considered. Results indicated that: 1) accurate students showed significantly better levels of executive functioning, and more positive affect and motivation related to Mathematics in comparison to their inaccurate peers. They also spent more time performing the tasks; 2) mathematics achievement, perceived usefulness of mathematics, and time spent on task 1, significantly predicted group membership, correctly classifying 71.3% of the sample. Mathematics achievement was the most significant variable; 3) calibration

accuracy was low in the general sample, and students showed a tendency towards over-confidence. However, calibration accuracy improved as achievement level increased. These results are discussed in terms of past and future research.

Immediate and long-term transfer effects of simulations on self-regulated learning

Mixed-method research,Pre-service teacher education,Metacognition,Self-regulation

Mary Gutman, Efrata College, Israel; Bracha Kramarski, Bar-Ilan University, Israel;

The training of pre-service teachers (n = 191) in self-regulation in learning (SRL) and in teaching (SRLT), was examined in two learning environments: Technology Environment Simulation (TES), and simulations in traditional environment, and was compared in two perspectives: dual perspective (2Póexplicitly teacher's self-regulation training as student and teacher [SRL & SRLT]) and single perspective (1Póexplicitly teacher's self-regulation training as teacher alone [SRLT]). Four learning conditions were established: TES +2P; TES +1P; 2P: 1P: Findings showed a generally significant contribution of the dual perspective approach to the technology environment simulations (TES+2P) compared with the single perspective (TES+1P) and dual/single perspective traditional environment approaches (2P, 1P) in the areas examined: pre-service teachers' SRL and SRLT; ability to transfer processes (immediate effect) on lesson design with respect to the student learning criterion, and positive long-term effects of actual teaching on the tasks / goals and student learning. Online SRLT process data showed the TES+2P group was more mindful when using the system Help function, particularly in the monitoring phase. Significant findings were shown for developing self-regulation dual perspectives in teacher education with technology.

E 23

26 August 2015 13:45 - 15:15

Room Cyan_F2

Paper Presentation

Higher education

Higher education and teacher professional development

Keywords: Qualitative methods,Teacher professional development,Teaching/instruction,Higher education,Educational policy,School effectiveness,Interdisciplinary,Primary education,Case studies,Pre-service teacher education,Reflection,Social interaction,Writing/Literacy,Conversation/ Discourse analysis,Secondary education

Sig's: SIG 1 - Assessment and Evaluation,SIG 11 - Teaching and Teacher Education,SIG 14 - Learning and Professional Development,SIG 4 - Higher Education

Chairperson: Bobby Hoffman, University of Central Florida, United States

Characteristics of effective and sustainable teaching centres

Qualitative methods,Teacher professional development,Teaching/instruction,Higher education

Heather Kanuka, University of Alberta, Canada; Linda Price, Open University, United Kingdom;

The purpose of this study was to gain a broader understanding of the factors that contribute to teaching unitsí effectiveness and sustainability. Using developmental phenomenography to examine ways of experiencing effective and sustainable teaching development centres, this study focused on the variations that teaching unit leaders experience effective and sustainable practices. The participants for this study were purposively selected from Australia, Finland, Sweden, Norway, US, Canada, and the UK (n=37). All participants interviewed worked within, or were responsible for, the centralized university teaching centres or units. The findings revealed that there are two important aspects to effective and sustainable teaching centres: (1) cornerstones for effective development and (2) teaching centre leadership.

Shouldnít they have a say? Attending to inspectorsí voices regarding the complexity of their work

Qualitative methods,Educational policy,School effectiveness,Interdisciplinary,Primary education

Charalambos Charalambous, University of Cyprus, Cyprus; Demetris Demetriou, CIIM, Cyprus;

Recent years have seen heightened accountability pressures on teachers and an increased emphasis on teacher evaluation. Inspectors are often one of the key players evaluating teachers and the quality of their work. Therefore, it is not surprising that prior research largely attends to how inspectors are perceived by teachers. Missing, however, seem to be studies that give voice to inspectors themselves and explore how they conceptualize, experience, and carry out their work. Making a step toward addressing this gap, in this phenomenological study, we recruited a purposive sample of 12 Cypriot inspectors and examined their perceptions regarding their role and experiences in pursing their duties. Because in Cyprus, where the study was conducted, the existing teacher evaluation system has been in operation for almost 40 years without any changes, despite its apparent limitations, the selection of Cyprus served as an intensity case, providing fertile soil for examining how inspectors themselves deal with the complexities of their role. Semi-structured interviews were conducted with each participant and analyzed using constant comparative method. The analysis pointed to the multiple roles inspectors undertake, the pressures to efficiently pursue such roles despite lacking necessary observation and evaluation tools, and the dead-ends in which inspectors find themselves arriving when having to work in a system that considers the greatest majority of teachers as proficient. The study findings could inform national and international attempts to revamp the existing teacher evaluation systems, by underlying the importance of not ignoring one key player in the system: inspectors.

Writing as a tool for professional identity formation in higher education

Case studies,Qualitative methods,Pre-service teacher education,Reflection,Social interaction,Writing/Literacy

Ian Thompson, University of Oxford, United Kingdom; Line Wittek, University of Oslo, Norway;

Writing is used as a core tool for learning in higher education; portfolio writing is one example of such a tool. In a Norwegian context of teacher education, portfolios have been frequently used, and several studies conclude that it can be a valuable tool for professional learning. In this paper we aim at digging deeper into the relationship between writing and learning. Theoretically we apply the concept of identity formation defined as a self-understanding to which one is emotionally attached and that informs one`s behavior and interpretations. Empirically we draw on a Norwegian case study from a one-year initial teacher program. We apply the development of portfolio writing as a window for research into emergent professional identity formation. All of the assignments in this particular practice involve reflections and comparisons on episodes from internship in relation to the syllabus in mother tongue didactics. This text has been analyzed by looking into how students position and reposition themselves as developing teachers. Our analysis shows that professional identity formation is supported from this particular portfolio practice. Aspects of particular importance is firstly that students continuously make conscious links in their writing between aspects of mother tongue didactics and the art of teaching Secondly it is of importance that students raise different voices in their assignments based on interviews with pupils and mentors in internship as well as the voices raised by the university lecturer and the syllabus. The third aspect of importance is that students critically discuss their own teaching from internship.

Teachersí changing discourse about student engagement during a pedagogic intervention

Conversation/ Discourse analysis,Teacher professional development,Reflection,Secondary education

Anna Pauliina Rainio, University of Helsinki, Finland; Riikka Hofmann, University of Cambridge, United Kingdom;

Many pedagogic interventions aim to counteract the problem of studentsí disengagement in learning but often fail to take into account the perceptions and practices of educational practitioners. In this article we analyse teachersí collaborative talk as an important part of developing school practices. We examine how teachers construct studentsí engagement as a goal of their work and how they, in the course of a research-based, school-led pedagogic intervention, begin to re-define this problem and their perceptions of their students. Using a discourse analytic framework, we analyse nine video-recorded group discussions with 30 teachers in a socially disadvantaged urban secondary school participating in a 2-year intervention study. We categorize the teachers' talk about their studentsí engagement as emphasising (1) Students as autonomous choice-makers; (2) Students as active doers and participants in school; and (3) Students as whole, embodied beings. During the intervention, teachersí talk shifted not only from negative to more positive talk of their students but also to seeing their students as more complex and embodied beings whose problems in school are not inevitable obstacles for classroom work but as

something that the teachers can start to do something at. In this paper we call this change in teachersí talk as ìenvisioned ideologyî. In pedagogic interventions there need to be what we call ìlatent supporting factorsî that can enable the development of this kind of ìenvisioned ideologyî.

E 24

26 August 2015 13:45 - 15:15

Room Green_A4

Paper Presentation

Self-efficacy

Self-efficacy and at-risk students

Keywords: Qualitative methods,Cultural diversity in school,Achievement,Attitudes and beliefs,Educational attainment,Self-efficacy,Quantitative methods,Second language acquisition,At-risk students,Literacy,Language (Foreign and second),Primary education,Student learning,Emotion and affect,Problem solving,Secondary education,Educational policy,Teaching/instruction

Sig's: SIG 1 - Assessment and Evaluation,SIG 17 - Qualitative and Quantitative Approaches to Learning and Instruction,SIG 21 - Learning and Teaching in Culturally Diverse Settings

Chairperson: Beno Csapo, University of Szeged, Hungary

Self-efficacy of immigrant students: A path to successful learning

Qualitative methods,Cultural diversity in school,Achievement,Attitudes and beliefs,Educational attainment,Self-efficacy

Miriam Ben-Peretz, University of Haifa, Israel; Tali Aderet-German, University of Haifa, Israel;

The global world we live in is characterized by large waves of migration. Education of immigrant students, and their success, has become a focus of interest and concern in host countries. Our paper focuses on successful young adult Ethiopian immigrants in Israel and the educational circumstances that led to their high achievement. The basic premise of our paper is that immigrants can excel and become highly successful in the receiving countries. In-depth narrative interviews were conducted with nine young adult Ethiopian immigrants who excelled in various professional domains. Concept maps were created by four of the nine participants, using the Concept Structuring Analysis Task (ConSAT) interview. Analysis of the narratives and concept maps revealed that all participants experienced discrimination and hardships, while also receiving support, both by their families and the education and welfare system personnel. Two personal themes which were significant in each of the narratives and concept maps were personal autonomy in decision making, as well as a sense of mission to contribute to their own Ethiopian

community. Both themes are related to the resilience of the participants in overcoming hardships. We interpret the findings of our study in the light of Banduraís theory of self-efficacy. We expand the notion of self-efficacy to include both autonomy in decision making concerning education processes, as well as expressions of responsibility to oneís community. Implications of this study for planning and implementing educational environments for immigrant students are discussed in the paper.

How do linguistic skills of L1 and L2 learners of German develop from 2nd to 3rd grade?

Quantitative methods,Second language acquisition,At-risk students,Literacy,Language (Foreign and second),Primary education

Lisa Paleczek, University of Graz, Austria; Susanne Schwab, Bielefeld University, Germany; Susanne Seifert, University of Graz, Austria; Barbara Gasteiger-Klicpera, University of Graz, Austria;

Deficits in the language of instruction can lead to disadvantages in childrenís school careers. Especially children whose first language is different to the language of instruction (L2 children), often show poorer outcomes at school than their peers (L1 children). The presented study addresses three research questions: To what extend do L1 and L2 learners differ in their reading, language and spelling abilities at (i) the beginning of 2nd and (ii) the beginning of 3rd grade? How do reading, language and spelling abilities of L1 and L2 children develop during (i) the 2nd grade and (ii) during the 3rd grade? Is the development of L1 and L2 learners different even when controlled for initial abilities? Decoding, reading comprehension, spelling, vocabulary and grammar skills were measured at the beginning and at the end of second and third grade. Multilevel analyses were conducted. Results showed that L2 children had lower test scores in reading comprehension but not in decoding. L2 particularly had a significant impact on the development of word and sentence comprehension. After controlling for initial abilities (reading, spelling, grammar, vocabulary), L2 ceased to be a significant predictor. The percentage of L2 children in class did not show any significant influence on class level. For decoding (word and non-word) and for reading comprehension (word and sentence), significant components on class and individual level were found. Between 21% and 42% of the variance could be explained on level two (class level).

Improving digital problem solving ability of Macaoís grade repeaters: A correspondence analysis

Quantitative methods,Student learning,At-risk students,Emotion and affect,Problem solving,Secondary education

Pou Seong Sit, University of Macau, Macau; Kwok-cheung Cheung, University of Macau, Macau; Soi-kei Mak, University of Macau, Macau; Man Kai Ieong, University of Macau, Macau;

This paper seeks to examine the association of some specific items of three quality education indicators in the PISA 2012 digital assessment, namely, perseverance, openness for problem-

solving, and ICT use at home for school-related tasks, with differing levels of digital problem-solving proficiency and gender of student, so as to provide empirical evidences to schools and teachers to help grade repeaters of both gender to advance in digital problem solving literacy. A multiple correspondence analysis is adopted so that the bi-plots of the extracted dimensions can show clearly and visually the association of the qualitative digital problem-solving learning and performance characteristics of Macaoís grade repeaters.

Exploring student characteristics that influence teacher judgments of student ability

Quantitative methods,Educational policy,Teaching/instruction,Achievement,At-risk students,Primary education

Kane Meissel, University of Auckland, New Zealand; Frauke Meyer, University of Auckland, New Zealand; Esther Yao, University of Auckland, New Zealand; Christine Rubie-Davies, University of Auckland, New Zealand; Helen Timperley, The University of Auckland, New Zealand; Fiona Ell, University of Auckland, New Zealand;

Teachersí judgments of student achievement are increasingly used for high-stakes decision making. As a result, these judgments can have serious implications for studentsí academic careers and self-concepts, so it is imperative that these judgments be as fair and reliable as possible. Using a large national database, we explored the relationship between psychometrically designed standardized achievement results and teacher judgments in reading, writing and mathematics, using hierarchical linear modeling. Our findings indicate that teacher judgments are systematically lower for already marginalized learners even after controlling for standardized achievement. Possible explanations such as school-level compositional effects did not explain these differences. These findings are concerning, and have critical implications for equity and social justice.

F 1

26 August 2015 15:45 - 17:15

Room Yellow_G1

ICT Demonstrations

Learning disabilities and special education

Social robots as co-therapists in autism therapy sessions

Keywords: Educational technology,Special education,Learning and developmental difficulties,Learning disabilities,Social interaction,Technology

Sig's: SIG 15 - Special Educational Needs

Chairperson: Andri Ioannou, Cyprus University of Technology, Cyprus

Social robots as co-therapists in autism therapy sessions

Educational technology,Special education,Learning and developmental difficulties,Learning disabilities,Social interaction,Technology

Iosif Kartapanis, Cyprus University of Technology, Cyprus; Andri Ioannou, Cyprus University of Technology, Cyprus;

Autism, also known as Autism Spectrum Disorder (ASD), is a complex neurological disorder that has its onset in the first few years of a childís life and most commonly affects the areas of communication and social interaction. The development and mass production of NAO, humanoid social robot, has given a great opportunity to explore the potential of robotics in ASD therapy and rehabilitation. NAO comes with a program (Choreograph) that enables therapists to easily program the robot, as well as iPhone compatible apps enabling its remote and in real-time control. We will present NAO and a series of applications that we used during therapy sessions with three ASD children.

F 2

26 August 2015 15:45 - 17:15

Room Blue2_D1

ICT Demonstrations

Teacher professional development

PedaGO: a New Interactive Learning Environment to Foster Teachersí Pedagogical Innovation

Keywords: Educational technology,In-service teacher education,Pre-service teacher education,Teacher professional development

Sig's: SIG 11 - Teaching and Teacher Education

Chairperson: Julien Mercier, University of Quebec in Montreal, Canada

PedaGO: A new interactive learning environment to foster teachersí pedagogical innovation

Educational technology,In-service teacher education,Pre-service teacher education,Teacher professional development

Julien Mercier, University of Quebec in Montreal, Canada;

One way to augment the use of educational research in teaching is to develop teachersí ability to use research findings to innovate in their practice. This demonstration of PedaGO is intended to familiarize potential users with the functionality of the tool, and with the range of contexts in teacher education in which PedaGO could be used. To provide a firm ground for discussion with the audience, the technical demonstration is grounded in the rationale underlying the tool, which was developed through our analysis of pedagogical innovation. A conceptual analysis led to a model of pedagogical innovation. A cognitive task analysis then determined the cognitive activities and necessary knowledge for pedagogical innovation, which involved determining an appropriate context for innovation in teaching, understanding research, and using findings in teaching practice. To strengthen the bridge between research and practice in teaching, the model was coupled with a model of pedagogical reasoning describing how teachers plan instruction. PedaGO is currently in its first year of use in graduate courses. This tool includes fixed and dynamic scaffolding. Fixed scaffolding includes an interface centered on the various steps of the task and a very detailed description of each subtask. In terms of dynamic scaffolding, PedaGO provides on-demand help in light of current conceptualizations of help-seeking. Models of tutoring frame the contents of the help available. The software also incorporates features geared towards the cumulative building of a library of pedagogical innovations that can be accessed by a broader educational community including preservice and in-service teachers.

F 3

26 August 2015 15:45 - 17:15

Room Cyan_F2

ICT Demonstrations

Technology integration

A Toolkit for Supporting Higher Education Instructors in Enriching Their Teaching with Social Media.

Keywords: Mixed-method research,Educational technology,Teacher professional development,Interdisciplinary,Higher education,Lifelong learning

Sig's: SIG 11 - Teaching and Teacher Education

Chairperson: Christian Rapp, Zurich University of Applied Sciences, Switzerland

A toolkit for supporting higher education instructors in enriching their teaching with social media

Mixed-method research,Educational technology,Teacher professional development,Interdisciplinary,Higher education,Lifelong learning

Christian Rapp, Zurich University of Applied Sciences, Switzerland; Jennifer Erlemann, Zurich University of Applied Sciences, Switzerland; Yasemin Gulbahar, Ankara University, Turkey;

In an EU FP7 Era.NET RUS project (www.somecat.org), analysis was undertaken of the status quo and the potential for using Social Media (SoMe) in teaching, learning, and research in higher education (HE) in four participating countries (Gulbahar 2014; Kilis, Gulbahar, Rapp 2014). The analysis applied a mixed-method approach: interviews/focus groups (n=213), an online teaching-style survey (n=39) using exploratory factor analysis (Gulbahar, Aslan et al. 2014), which resulted in the development of a social media strategy for HE (Gulbahar & Rapp 2014). Potential benefits of social media usage for HE teaching, learning, and research were confirmed. However, many instructors find it difficult to integrate the subject they want to teach through the application of meaningful instructional design and the use of technology. Consequently, based on the research results, a social media toolkit for education (www.socialmediaforeducation.org), targeted at HE instructors, was developed, and subsequently validated (Kilis et al. 2014).

F 4

26 August 2015 15:45 - 17:15

Room Green_A8

Workshops

Assessment methods and tools

Using Item Response Theory for Comparative Studies

Keywords: Comparative studies,Psychometrics,Assessment methods and tools,Social sciences,Doctoral education

Sig's: SIG 1 - Assessment and Evaluation

Chairperson: Deana Desa, IEA Data Processing and Research Center, Germany

Using item response theory for comparative studies

Comparative studies,Psychometrics,Assessment methods and tools,Social sciences,Doctoral education

Deana Desa, IEA Data Processing and Research Center, Germany;

Item response theory (IRT) is considered as a modern test theory applied in numerous disciplines such as psychology, political science, sociology as well as education. IRT is useful for development, scaling and analysis of latent trait of measurement from psychological surveys or educational tests. IRT is also a sophisticated tool for using survey or assessment data for comparative studies between different groups, for example gender, ethnics, geographical regions

or countries. This workshop is intended to introduce different IRT models for comparative studies, and to demonstrate examples within educational comparative programs (e.g., TIMSS, PIRLS). The workshop participants will have the opportunity to learn the conceptual basis of IRT, to be actively involved in hands-on exercises, and to collaborate with the workshop instructor about their research using IRT.

F 5

26 August 2015 15:45 - 17:15

Room Blue2_D2

Workshops

Teacher professional development

Towards a Professional Learning Culture in Schools

Keywords: Teacher professional development,Attitudes and beliefs,Secondary education,Workplace learning,Communities of practice,Lifelong learning

Sig's: SIG 14 - Learning and Professional Development

Chairperson: Henk Sligte, University of Amsterdam, Netherlands

Towards a professional learning culture in schools

Teacher professional development,Attitudes and beliefs,Secondary education,Workplace learning,Communities of practice,Lifelong learning

Henk Sligte, University of Amsterdam, Netherlands; Ditte Lockhorst, Oberon research institute, Netherlands; Wilfried Admiraal, Leiden University, Netherlands;

Professional development of teachers is a main theme in current discussions in educational policies, practices and research. Teachers should not only work on their own life-long professional development, they are required to collaborate with colleagues in schools and teacher networks outside school and to work on collective school aims such as community building and shared visions on learning and teaching. An effective professional learning culture (PLC) in school seems to be essential for learning and development of teachers . We have investigated the workplace affordances in schools that support learning of teachers and stimulate a PLC in schools. In the proposed workshop, we will introduce an interactive scan for measuring a PLC in schools. With the scan teachers and school leaders can estimate to what extent building blocks of a PLC are realised in their school and what they think is desirable for the near future. Participants get acquainted with the scan in small groups and help to further validate the scan discussing the theoretical framework of the scan, the elements of the scan and how participants might use the scan in their own context.

F 6

26 August 2015 15:45 - 17:15

Room Yellow_G4

Workshops

Researcher education

Enhancing the graduate student-supervisor relationship through the practice of gratitude

Keywords: Case studies,Qualitative methods,Researcher education,Attitudes and beliefs,Values education,Doctoral education

Sig's: SIG 24 - Researcher Education and Careers

Chairperson: Kerry Howells, University of Tasmania, Australia

Enhancing the graduate student-supervisor relationship through the practice of gratitude

Case studies,Qualitative methods,Researcher education,Attitudes and beliefs,Values education,Doctoral education

Kerry Howells, University of Tasmania, Australia;

This highly interactive workshop is for both graduate research students and supervisors and explores the application of recent research that demonstrates the part an increased attention to the practice of gratitude can play in building both personal resilience, stronger relationships, and improved research outcomes. A particular focus of the workshop is how resentment ñ which is conceptually the opposite of gratitude ñ can undermine both the creative process as well as personal and relational wellbeing. Positioned in the context of supervisor-student relationships, participants will explore proactive ways of expressing complaint, and see how this is a powerful means of also expressing gratitude. The workshop will draw on data that captures experiences reported by students and supervisors in a recent pilot study in the Faculties of Medicine and Physical Sciences. Outcomes from this study have highlighted themes of enhanced social and personal well being; clearer thinking processes; and improved productivity, when students and supervisors more fully recognise what they receive from the research process and actively give back from this acknowledgment. The workshop will also address the identified challenges in taking up gratitude in this context: lack of trust; cross-cultural differences; and conceptual misunderstandings.

F 7

26 August 2015 15:45 - 17:15

Room Green_A2

Thematic Poster

At-risk students

At-risk students

Keywords: School effectiveness,Achievement,At-risk students,Social sciences,Primary education,Quantitative methods,Teacher professional development,Secondary education,Action research,Student learning,Self-regulation,Writing/Literacy,Higher education,Cooperative/collaborative learning,Special education,Learning and developmental difficulties,Social interaction

Sig's: SIG 15 - Special Educational Needs,SIG 18 - Educational Effectiveness,SIG 4 - Higher Education,SIG 9 - Phenomenography and Variation Theory

Chairperson: Riitta-Leena Metsapelto, University of Jyvaskyla, Finland

The effect of extended education and oral language skills on school performance in children at risk

School effectiveness,Achievement,At-risk students,Social sciences,Primary education

Benjamin von Allmen, University of Bern, Switzerland; Marianne Schuepbach, University of Bamberg, Germany;

Children with a low socio-economic status and immigrant background (often called ëchildren at riskí) perform lower in school than other. In Switzerland an action taken to confront such educational inequalities was the establishment of all-day schools - schools that in addition to regular school hours also offer extended education offerings. The present study aims to empirically examine whether the participation of at risk children in extended education offerings in Switzerland has an impact on school performance and whether this influence is mediated by oral language skills. Data is provided by the research project ëEduCare-TaSe ñ All-Day School and School Success?í, funded by the Swiss National Science Foundation. EduCare-TaSe is a quasi-experimental longitudinal study investigating 1,800 students in all-day schools during the first two years of primary school. It is expected that the attendance of extended education offerings will have a positive impact on school performance in children at risk. Further it is expected that this influence can be explained by the positive impact of extended education offerings on oral language skills.

Teachers and principals perspective on school dropout at the secondary education in Costa Rica

Quantitative methods,School effectiveness,Teacher professional development,Secondary education

Alberto Nagle Cajes, Universidad ORT-Uruguay, Uruguay;

The aim of the paper is to focuses on the study of mechanisms of school disengagement of students at the lowest level of secondary education (7th through 9th grade) in Costa Rica. . The idea is to understand teachers and principals perception of drop out at the lower level of secondary education. Do teachers and principals consider that drop out at secondary education is an important issue in their work? This is actually the major theoretical shortcoming in the research field. The problem is widespread both in Western Europe, Latin America and USA. The methodological approach to the research of teachers and principals conceptions of studying at the lower level of secondary education is qualitative. The study ascribes to the phenomenographic approach. The findings of the study are the following: i) A Theoretical Typology to understand the mechanisms of disengagement at the lowest level of secondary education from the point of view the teachers and principals, ii) the main categories of the typology are the following: a) Drop out as a socioeconomic issue, b) School dropout as a family issue, c) School drop-out as a result of irrelevant curriculum design, d) School disengagement as a clash between the culture of the family and the culture of the school, e) School as an irrelevant issue for the students, f) School disengagement as a failure of the socialization mechanisms. The paper also sheds some light on the conceptions of dropping students to studying at the lower level of secondary education. The paper generate relevant knowledge for dropout prevention.

The effect of writing strategy development workshops on an academic writing task

Action research,Student learning,Self-regulation,Writing/Literacy,Higher education,Cooperative/collaborative learning

Lieve De Wachter, ILT/K.U.Leuven, Belgium; Jordi Heeren, KU Leuven, Belgium;

Many academic writing and learning centres around the world are concerned about the entry-level academic writing skills of undergraduate students. The aim of our research is to develop effective tutoring sessions for at-risk students at the start of their first year at the university. These students are selected by a valid and reliable academic literacy test that shows a significant correlation with academic achievement (De Wachter et al. 2013). In the poster presentation we will discuss the effect measurement of three intensive writing workshops. The workshops are part of a coaching programme following the language test and focus on writing strategy development through methods such as observational learning and collaborative writing (De Wachter & Heeren 2012; Graham & Perrin 2007). Both a qualitative and a quantitative study have been carried out to measure the effectiveness of the intervention. Each year, students receive a questionnaire to evaluate different aspects of the workshops. Next to that, the quality of students' texts is measured through a one group, pretest-posttest design. Two experienced raters assess the texts on two lower order concerns (LOCs): ëspellingí and ëgrammarí and several higher order concerns (HOCs) such as ëtext coherenceíand ëscientific styleí. The questionnaires indicate that the majority of students perceive the workshops as useful for their writing practice. The preliminary results of the quantitative study show that the 32 students that followed all three workshops, significantly improved on the HOCs. There are no significant changes in spelling and grammar.

Do classroom behaviour problems or classroom learning difficulties predict social exclusion?

Quantitative methods,Special education,At-risk students,Learning and developmental difficulties,Social interaction

Johanna Krull, University of Potsdam, Germany; Moritz Bornert, University of Potsdam, Germany; Jurgen Wilbert, Universitat Potsdam, Germany; Thomas Hennemann, University of Cologne, Germany;

Recent studies focusing on the social participation of students in inclusive education show a mostly adverse social integration of students with special educational needs (e.g. Bless & Mohr, 2007; Kavale & Forness, 1996). The results of the majority of these studies are based on cross-sectional study designs, therefore descriptions of causal relations are not possible. Consequently the question poses, whether special educational needs can be seen as causal to or as a result of social exclusion. To address this gap, surveys were administered with 972 students with and without classroom learning difficulties and classroom behavior problems in 2012 and 2013 in Germany. Three cross-lagged-panel-Designs (Lazarsfeld & Fiske, 1938) were applied in data analysis. The focus of this analysis lay on the question, whether and to which amount social exclusion in the second grade could be predicted by classroom behavior problems and classroom learning difficulties in the first grade. Moreover we investigated whether classroom learning difficulties and classroom behavior problems in the second grade could be predicted by social exclusion in the first grade. The results show that increased classroom behavior problems in the first grade lead to a higher social exclusion in second grade (? = 0.08) and higher social exclusion in the first grade increases the risk of classroom behavior problems in the second grade (? = 0.19). Both paths differ significantly from each other. The second path is significantly higher than the first one. Regarding students with classroom learning difficulties, these correlations could not be found.

F 8

26 August 2015 15:45 - 17:15

Room Green_A3

Thematic Poster

Cognitive development

Cognitive development and conceptual change

Keywords: Experimental studies,Student learning,Conceptual change,Misconceptions,Science education,Primary education,Cognitive development,Metacognition,Self-regulation,Lifelong learning,Qualitative methods,Pre-service teacher education,Attitudes and beliefs,Game-based learning,Mixed-method research,Developmental processes,Secondary education,Numeracy,Mathematics,Early childhood education,Social development

Sig's: SIG 11 - Teaching and Teacher Education,SIG 16 - Metacognition,SIG 3 - Conceptual Change,SIG 5 - Learning and Development in Early Childhood

Chairperson: Esther Adi-Japha, Bar-Ilan University, Israel

Invalid inferences from reading science text are like misconceptions in developmental studies

Experimental studies,Student learning,Conceptual change,Misconceptions,Science education,Primary education

Irini Skopeliti, University of Patras, Greece; Stella Vosniadou, National and Kapodistrian University of Athens, Greece;

The hypothesis that the invalid inferences generated from reading counter-intuitive science text are similar to misconceptions obtained in cross-sectional developmental studies was examined in a text comprehension experiment. Seventy-nine, 3rd and 5th graders participated in a pretest-posttest study consisting of an experimental and a control group. The experimental group read and recalled a text that provided a scientific explanation of the day/night cycle, while the control group read and recalled a text that provided an explanation consistent with childrenís initial beliefs based on phenomenal experience. All participants gave pretest and posttest explanations of the phenomenon in question. The results of the pretest showed that the children provided initial or alternative explanations of the day/night cycle similar to those obtained in previous research. The children who read the scientific explanation text recalled less information and created more invalid inferences than the children who read the initial text. A qualitative analysis of these invalid inferences showed that they are similar to the misconceptions obtained in previous developmental research, supporting the hypothesis that misconceptions are best interpreted as ësyntheticí or ëfragmentedí constructions, resulting from the assimilation of scientific information to incompatible prior knowledge based on everyday experience.

Reciprocal relations between metacognitive control and monitoring processes across the lifespan

Experimental studies,Cognitive development,Metacognition,Self-regulation,Lifelong learning

Elisabeth Loeffler, University of Wuerzburg, Germany; Nicole von der Linden, University of Wuerzburg, Germany; Wolfgang Schneider, University of Wurzburg, Germany;

Recent outcomes have challenged the ìmonitoring affects controlî-view (MC-model) of procedural metacognition, providing first evidence for bidirectional links between both processes. In goal-oriented settings learners adjusted their study time (ST) on the basis of Judgments of Learning (JOLs), whereas in data-driven situations, subjects inferred monitoring judgments from control processes, e.g. from ST allocated to an item (CM-model). There is evidence that the MC-model is valid from elementary school on while the impact of control processes on monitoring seems to increase until adolescence. However, there is still a lack of studies contrasting both models using a within-subject design. Furthermore, there neither have

been any studies investigating this interplay in older adults nor using a comprehensive sample representing the lifespan to explore this issue. Our study includes data of four age groups (ranging from 7 to 75 years). In the first trial subjects had to allocate ST to paired-associates after making JOLs (MC-model). In the second trial JOLs had to be indicated after the items were studied in a self-paced manner (CM-model). Results showed that all subjects were able to monitor their performance accurately. In trial 1 all participants adjusted their ST on the basis of their JOLs. However, only the younger adults showed a substantial correlation between ST and JOLs in trial 2. It appears that the mutual impact of monitoring and control is most pronounced in young adults. The other age groups exhibited difficulties distinguishing between MC and CM mechanisms. Possible explanations for this developmental trend will be discussed.

Teacher educatorsí conceptual change: Constraints and possibilities

Qualitative methods,Pre-service teacher education,Attitudes and beliefs,Conceptual change,Game-based learning

Viviana Gomez, Pontificia Universidad Catolica de Chile, Chile;

Despite there is wide consensus about the necessity about offer the best quality of education for the poorer population of students, teacher education programs do not directly address to student teachersí beliefs, and also teacher educators are not aware of their own beliefs about poverty. So it is necessary to provoke their conceptual change. 32 teacher educators participated in four "groups of inquiry" (two formats applied to two types of universities), consisted in serious game, evidence, and cases. The analysis shows differences in: 1) way of recruitment, 2) identities, 3) reflection, 4) facing the games, 5) Eliciting factors of change.

Elementary and middle school studentsí development of epistemic stance and higher order thinking

Mixed-method research,Student learning,Cognitive development,Developmental processes,Primary education,Secondary education

Daniel Dinsmore, University of North Florida, United States; Meghan Parkinson, University of North Florida, United States;

Abstract Data are presented from year two of a longitudinal study investigating third through eighth gradersí high-order thinking, focusing on the relation of individualsí epistemic orientations to how they structure responses to open-ended questions. Seventy-eight third through eighth graders participated. Participants completed a measure of epistemic thinking (adapted from Kuhn & Weinstock, 2002) and one randomly assigned open-ended question about a science, history, mathematics, or poetry topic. The majority of students maintained the same epistemic stances after a year of schooling, however twice as many students showed increased complexity in their epistemic stances than decreased complexity. A majority of students demonstrated the same or worse quality in their open-ended responses from year one to year two. This study has implications for how teachers help students coordinate their developing epistemic stances and complex reasoning for problem solving.

The role of early math skills and memory in the development of non-symbolic number line estimation

Cognitive development,Numeracy,Mathematics,Early childhood education,Primary education

Jaccoline van 't Noordende, Utrecht University, Netherlands; Evelyn Kroesbergen, University of Utrecht, Netherlands; Chiel Volman, Utrecht University, Netherlands; Paul Leseman, Utrecht University, Netherlands;

Although symbolic number line estimation has received much attention in the past years, less is known about non-symbolic number line estimation and its development in early childhood. The present study has investigated the relation between non-symbolic number line estimation and verbal and visuo-spatial memory, quantity comparison and counting skills in 3.5-year-old children. A follow-up will take place in spring 2015, when the children are 5 years old to investigate the predicative value of early math skills and memory skills for number line estimation in kindergarten. Fifty-two 3.5-year-old children were tested on symbolic number line estimation (mapping dot quantities 0-100 on a line), quantity comparison, counting skills, verbal memory and visuo-spatial memory. The results showed that quantity comparison and verbal memory were positively related to non-symbolic number line estimation. No significant relation was found between visuo-spatial memory, counting skills and non-symbolic number line estimation. These results and the results of the follow-up will be presented at the EARLI conference and implications for theories about the development of number-space mapping will be discussed.

On the relation between executive functions and theory of mind

Experimental studies,Cognitive development,Developmental processes,Social development,Early childhood education

Wiebke Friederike Evers, Ulm University, Germany; Katrin Hille, Ulm University, Germany; Laura Walk, Ulm University, Germany;

Aim: Studies showed that advances in executive functions (EF) are bound up with the development of theory of mind (ToM). Research on how the different components of EF are related to ToM is inconclusive. The aim of the present study was to take a closer look at the relation between EF and ToM of children between 3 and 6 years. Methods: 536 German preschoolers (35 to 80 months) participated in the study. EF were assessed using the Block Recall and Digit Span (working memory), Tower and Sticker choice task (inhibitory control), and the Dimensional Change Card Sort (DCCS, cognitive flexibility). ToM was assessed using a perspective taking (PT) task. Results: The correlational analysis showed significant but weak correlations for ToM with inhibitory control and working memory for all ages except the 3-year olds. For different age groups different EF measures were related to ToM. To assess the individual contributions to ToM, a standard linear multiple regression analysis was carried out. Performance on EF measures and age as predictors of ToM were entered. The overall equation was highly significant. The variables Sticker choice task, Digit Span, and age added statistically significantly to the prediction (all $p < .02$), Tower and DCCS did not. Discussion: Understanding

how ToM develops and what competences might influence its emergence is of high importance. The present study suggests the development of ToM could be supported by promoting the inhibitory control and working memory.

F 9

26 August 2015 15:45 - 17:15

Room Green_A5

Thematic Poster

Collaborative and cooperative learning

Collaborative and cooperative learning

Keywords: Case studies,Qualitative methods,Social aspects of learning,Social sciences,Secondary education,Quantitative methods,Peer interaction,E-learning/ Online learning,Computer-supported collaborative learning,Cooperative/collaborative learning,Instructional design,Reading comprehension,Science education,Conversation/ Discourse analysis,Argumentation,Emotion and cognition,Interdisciplinary,Informal learning,Video analysis,Educational technology,Self-regulation,Mixed-method research,School effectiveness,Mathematics

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 14 - Learning and Professional Development,SIG 26 - Argumentation, Dialogue and Reasoning,SIG 6 - Instructional Design,SIG 7 - Learning and Instruction with Computers

Chairperson: Mariel Miller, University of Victoria, Canada

Acts of recognition and learner identity construction in joint activity

Case studies,Qualitative methods,Social aspects of learning,Social sciences,Secondary education

Deydi Saballa Pavez, University of Barcelona, Spain; Mariana Largo Sierra, University of Barcelona, Spain;

This pilot study focuses on the identification and characterization of the actions directed toward students that they interpreted as carrying meanings about themselves as learners. These actions occur in the joint activity between teachers and students throughout a didactic sequence -DS-. In the model of learner identity construction -LI-, the acts of recognition -AoR- are described as actions that can produce a sense of recognition as learner. AoR are situated in the plane of the interpsychological process of LI construction, specifically, in the joint activity of learning activities. The design is a case study corresponding to a DS of a course in a secondary education school. The data collection considered: Observation and recording of the DS and written interviews to all students at the end of each session of the DS. The units of analysis have been

two: AoR that arise in the interactions along the DS and the subjective experience of recognition as learner. Preliminary results have permitted, in principle, to develop a strategy for the identification and characterization of AoR and, also, to outline the structure and dynamics of AoR according to: the actors involved, the meanings they convey and the characteristics of the joint activity. Taken together, the results help to understand the role of AoR in the LI construction while learners participate in learning activities. Keywords: Acts of recognition; joint activity; learner identity

Students sharing learning materials via SNS: Altruistic behaviour in a competitive world?

Quantitative methods,Peer interaction,Social aspects of learning,E-learning/ Online learning,Computer-supported collaborative learning,Cooperative/collaborative learning

Edith Bouton, Hebrew University of Jerusalem , Israel; Christa Asterhan, Hebrew University of Jerusalem, Israel;

This study aims to take a closer look at studentsí sharing of learning materials via social network sites. In a competitive educational reality in which relative excellence is rewarded with different incentives, why should students invest in helping others? We focus on the scope of the phenomenon, what, when and how students share, how it affects grades and the reasons for sharing and using such materials. Preliminary results from a pilot study (38 Israeli high school students from 22 schools) show that sharing learning materials is a very common practice. Students recognize the advantages of receiving shared materials (higher grades, peersí support) but at the same time they also struggle with personal and ethical dilemmas with regards to it (feelings of exploitation or inadequacy or conflicts regarding cheating). We are currently collecting data from a larger data set (N = 200 secondary school and N = 200 university students).

Combining self-explanations with cooperative learning: Does it work?

Instructional design,Peer interaction,Reading comprehension,Science education,E-learning/ Online learning,Cooperative/collaborative learning

Stephan Mende, Dresden Technical University, Germany; Antje Proske, TU Dresden, Germany; Hermann Korndle, Dresden Technical University, Germany;

Self-explanation is an empirically proven method which promotes deep learning. In cooperative learning, achievement is often poor due to learnersí tendency to superficial process learning material or the failure of the learning partners to establish common ground. To foster co-constructive knowledge acquisition we developed a cooperation script which combines phases of individual self-explanations with dyadic exchange. The script was experimentally evaluated with 88 undergraduates, randomly assigned to one of two e-learning conditions. First, both groups read a text paragraph. Subsequently, the control group thought about discussion points for the upcoming cooperation, while participants of the scripted group were prompted to individually generate self-explanations and exchange them with their partner. Afterwards, dyads in both conditions chatted on the paragraph to improve their text understanding. These procedures were

repeated for every paragraph in each condition. Finally, posttest measures of shallow and deep text comprehension were captured. The results showed no significant main effects of the cooperative script on posttest achievement. However, prior knowledge moderated the relationship between condition and deep level achievement. Low prior knowledge learners in the scripted group outperformed those in the control group, while no significant differences were found for more knowledgeable learners. Thus, these results suggest that individual self-explanations may have been a necessary precondition for the goal-oriented clarification of comprehension problems and a deep knowledge co-construction in the chat-phase for low knowledgeable learners. High-knowledge learners may not need an additional self-explanation phase. Chat-log analyses are ongoing. Implications for designing effective cooperation scripts in e-learning will be discussed.

Group emotions in argumentation: Specifying relations between social and cognitive functions

Conversation/ Discourse analysis,Argumentation,Emotion and cognition,Interdisciplinary,Informal learning,Cooperative/collaborative learning

Claire Polo, ICAR Laboratory, France; Kristine Lund, University of Lyon, France; Christian Plantin, ICAR laboratory, France; Gerald Niccolai, ICAR laboratory, France;

Emotions were recently recognized as key elements of reasoning and learning processes in literature on argumentation studies and in research on collaborative learning. Taking a perspective gained from several of our past empirical studies, we propose a model of the role of emotions in argumentation, identifying their social and cognitive functions and the relations between them. On the social side, students may experience and display emotions related to the way in which their faces are engaged in the interaction. Such feelings are decisive for group engagement into exploratory, cumulative or disputational talk (Mercer, 1996). On the cognitive side, the emotional framing of the problem is inherent to the process of schematization (Grize, 1996), which orientates the discourse towards a given argumentative conclusion. We observed a correlation between these two phenomena, the emotional intensity of the debate on the cognitive side and the nature of group talk on the social side. These results can inform pedagogical design in order to foster high quality student interactions.

Collaborative drawing with interactive table in physics: Groupsí regulation and task interpretation

Quantitative methods,Video analysis,Educational technology,Self-regulation,Social aspects of learning,Computer-supported collaborative learning

Arttu Mykkanen, University of Oulu, Finland; Hannie Gijlers, University of Twente, Belgium; Hanna Jarvenoja, University of Oulu, Finland; Sanna Jarvela, University of Oulu, Finland; Lars Bollen, University of Twente, Netherlands;

This study explores the relationship between secondary school studentsí (N=36, nine groups) group membersí task interpretation and individual and group level regulation during

collaborative computer- supported drawing task. Furthermore, it investigates how these factors are related to students learning gains, curiosity for science, feelings of flow and perceptions of collaboration and group processes. The students were invited to use a drawing software on an interactive table in order to make a shared poster of the physics subject matter, namely center of gravity. The collaborative working was videotaped and studentsí individual learning gains were assessed with domain knowledge pre- and post-tests. In addition, the students completed science curiosity, flow experience and collaboration scales. The quantitative analysis was made to the questionnaire data. The analysis of the video data focused on sequencing studentsí utterances in terms of expressed attempts to self-, co-, and shared regulate the collaboration process, and expressing task interpretation within the groups. The results show that there were a significant increase in the students learning gain. There were also a relation between flow and perceived collaboration. However, even though all the groups discussed about the qualities of a good poster, there were some variations in the content and timing of the task interpretation dialogue. The groups also engage in regulating their collaboration process, and the regulation was linked to the dialogue about the task interpretation. The relation between individual measures and the regulation and task interpretation as expressed in the dialogues will be investigated in more details.

Examining changes in teacher educators' collaborative learning

Mixed-method research,School effectiveness,Social aspects of learning,Mathematics,Informal learning,Cooperative/collaborative learning

Henderijn Heldens, Eindhoven University of Technology , Netherlands; Perry den Brok, Eindhoven University of Technology, Netherlands; Nienke Moolenaar, Utrecht University, Netherlands; Anouke Bakx, Fontys PABO Eindhoven, lectoraat L&I., Netherlands;

Collaborative learning is an important factor for innovation in education. Although not much is known of changes in collaborative learning over time, it is assumed that changes follow a linear pattern, such as shown by the model of Wenger (1998). Recently dynamic systems theory is used to study human development. In this study data of teacher educatorsí collaborative learning are used to argue that, to obtain a comprehensive view of changes in collaborative learning, more complex change theories are needed. A large-scale educational innovation in teacher education institutes in the Netherlands was used as a context for this study. Teacher educators in the mathematics departments participated in the research. Growth curve modelling was used to analyse patterns in relational and cognitive aspects of teacher educatorsí perceived collaborative learning and their observed learning. Data were collected during the first two years of the implementation of this innovation using network survey and data on email traffic. Results showed non-linear changes in teacher educatorsí perceived collaborative learning (cubic change rate ñ e.g. decrease-increase-decrease- in the perceived) and also differences between individual teacher educators. Qualitative analyses of the email content showed that 77.3% of the emails could be labelled as high interdependent, indicating that there were positive conditions for learning during the exchange.

26 August 2015 15:45 - 17:15

Room Brown_B4

Thematic Poster

Higher education

Higher education

Keywords: Mixed-method research,Pre-service teacher education,Attitudes and beliefs,Competencies,Higher education,Inquiry learning,Qualitative methods,Assessment methods and tools,Interdisciplinary,At-risk students,Culture,Comparative studies,Design based research,Learning analytics,Instructional design,Computer-assisted learning,Teaching/instruction,Professions and applied sciences,Motivation and emotion

Sig's: SIG 11 - Teaching and Teacher Education,SIG 4 - Higher Education

Chairperson: Antti Rajala, University of Helsinki, Finland

PREP21 - Preparing teacher student for 21st century learning practices: Ways of thinking and working

Mixed-method research,Pre-service teacher education,Attitudes and beliefs,Competencies,Higher education,Inquiry learning

Kati Makitalo-Siegl, University of Eastern Finland, Finland; Paivi Hakkinen, University of Jyvaskyla, Finland; Sanna Jarvela, University of Oulu, Finland; Arto Ahonen, University of Jyvaskyla, Finland; Piia Naykki, University of Oulu, Finland; Erkko Sointu, University of Eastern Finland, Finland; Teemu Valtonen, University of Eastern Finland, Finland;

Teacher education has s significant role in preparing pre-service teachers with adequate 21st century skills, i.e. skills for learning, creative and critical thinking, collaboration, and the ability to take advances of ICT. However, the current teaching practices do not often respond to the needs of the 21st century learning environments, such as inquiry and student-centered approaches and the use of ICT (social media, wikis, blogs, mobile technology). These, in turn, require teacher students to have skills for self-regulation, collaboration and ability of using ICT in teaching and learning. The aim of the project is to study the development of teacher studentsí 21st century skills and the influence of different pedagogical designs on these skills. The overall aim is to outline inquiry-based pedagogical designs where strategic skills, collaborative problem-solving skills, and a positive attitude and skills to use ICT are the central elements. In the longitudinal study, including both large-scale, process-oriented and outcome data, we will be better able to outline the factors that affect the development of future teachersí skills, competencies and attitudes in the long run. Altogether, the longer term goal of the project is that teacher education units are able to provide their students with better abilities and readiness to use

ICT in a pedagogically meaningful way, to provide their pupils with skills for the 21st century, and also empower future teachers to be able to meet the demands of the 21st century

Evaluation of intermediate assessment in higher education

Qualitative methods,Assessment methods and tools,Attitudes and beliefs,Interdisciplinary,Higher education

Indira Day, Leiden University, Netherlands; Floris van Blankenstein, Leiden University, Netherlands; Michiel Westenberg, Leiden University, Netherlands; Wilfried Admiraal, Leiden University, Netherlands;

Leiden University has introduced intermediate assessment into the curriculum to improve studentsí effort and pacing. Previous research indicates that intermediate assessment may improve student achievement through the testing effect, the spacing effect, and formative effects. However, if staff and students do not positively evaluate intermediate assessment the implementation will be unsuccessful. In the current paper staff and students of ten courses in four Bachelor programs were interviewed to see how they have experienced intermediate assessment. Teachers were interviewed individually or in duoís, while students were interviewed in focus groups. Questions mainly focused on curriculum representations and student study behaviour. In general, teachers feel positively about intermediate assessment, even though they may be critical of some of the preconditions. The experiences in the first year of using intermediate assessment led them to adapt their assessments in the new academic year, but these were mainly small changes.

Factors of university drop-out: A systematisation

Qualitative methods,At-risk students,Competencies,Culture,Higher education

Philipp Nolden, RWTH Aachen University, Germany; Marold Wosnitza, RWTH Aachen University, Germany;

University drop-out rates in Germany were stable on a high level of 28% over the past decade. Research on university drop-out from different theoretical perspectives has detected a large number of factors. Lead by an integrative framework based on Parsons structure-functionalism and the AGIL-Scheme it was hypothesized that the general system of action is constituted by four subsystems with a unique function for the general system. Assuming that the system of action has to be in balance, this paper aims to explore and identify functional and dysfunctional factors in academic decisions. An expert inquiry with N=72 student counsellors extracted factors from the personality system like intrinsic motivation, autonomy and problem-solving skills as important functional factors. Malfunctions of goal attainment constituted e.g. by false expectations or a lack of interest are important dysfunctional factors for student success. Using the critical incident technique the counsellors stated more internal factors like under- or overestimating of own abilities than self-reported studies by students, which often attribute the reasons for failure externally, e.g. by a high workload. The results are basis to further modelling of the framework.

Transforming degree programs to flexible learning

Comparative studies,Design based research,Learning analytics,Instructional design,Higher education,Computer-assisted learning

Claude Matthias Mueller Werder, Zurich University of Applied Sciences (ZHAW), Switzerland; Michael Stahl, ZHAW, Switzerland;

Many universities are looking for a coherent response to higher education dynamics, such as technological innovations (MOOCs) and increasing competition. This paper analyses such an initiative from a learnerís perspective and depicts its effectiveness. In the new flex program, classroom learning time will be reduced by half and replaced by a self-study e-learning environment that includes instructional videos. In this paper, the strategy and processes of the transformation of the courses are discussed, and the results of the empirical research of the pilot module are presented. To analyse the effectiveness of learning, we used a quasi-experimental, posttest-only design in which the final exam scores of the students in the experimental flex group (N=165) and the control group (N=428) were compared. Regarding the learning process and the perceptions of the learning design, the students completed two questionnaires in the term and a post-questionnaire. The preliminary findings of the process study revealed that the students could adapt to the flex learning and teaching approach: 60% of the students assessed the self-study phase as motivating or very motivating, 83% of students found the content structure of the self-study phase to be logical and comprehensible, and 70% considered the usability of the e-learning platform as positive and technically simple. The qualitative analysis showed that students recognised in particular the value of studying independently of location and time. The exam results are currently under analysis and will be available for presentation at the EARLI 2015 conference.

Research readiness in undergraduate students: Teachersí beliefs and disciplinary differences

Design based research,Teaching/instruction,Competencies,Higher education

Carolina Guzman-Valenzuela, University of Chile, Chile; Carlos Gonzalez-Ugalde, P. Catholic University of Chile, Chile; Sara Villagra, Universidad de Valladolid, Spain;

This paper presents the preliminary results of a research study focused on the teaching-research nexus debate and the beliefs of a group of university teachers in promoting research skills among undergraduate students. Design Based Research is used here to analyze curricular innovations in different disciplines. In the first stage, six teachers from diverse disciplines, who teach diverse topics in different years, were interviewed. Results show that a number of factors influence the character of the perceived link between teaching and research and the studentsí ëresearch readinessí: field of the undergraduate programme, subject, year of study, and institutional support. The two dimensions of ëhard/soft íand ëpure/appliedí may be playing out differently within the research-teaching nexus. In pure hard sciences students are perceived as being ready to be involved in research activities only after having developed a strong specialized knowledge base. In pure soft sciences students might be immersed in research-like activities from the very

beginning. In applied both hard and soft sciences research skills are developed in the second half of the programme. Academics believe that institutions can exert their own agency by playing an important part in enhancing the teaching-research nexus within curricula.

Building engaging college classrooms: Creating a tool for measurement

Mixed-method research,Professions and applied sciences,Higher education,Motivation and emotion

Suzanne Lindt, Midwestern State University, United States; Stacia C. Miller, Midwestern State University, United States;

The purpose of this research was to provide insight to areas in which professors can increase college classroom engagement. In Study 1, undergraduate students participated in focus groups to discuss factors influencing engagement in the college classroom. From the data, researchers identified five themes used to create a Likert-scale for measuring engagement in the classroom. In Study 2, the Likert-scale was distributed to students (N=177) on a university campus. An exploratory factor analysis was performed to reveal two factors (Teaching Persona, ?= .83; Learning Environment, ?= .82) describing a measure of engagement in the college classroom. Future research may utilize the scale to measure engagement in individual college classes to assist professors in creating environments to enhance student learning and help them persist beyond the first year of college.

F 11

26 August 2015 15:45 - 17:15

Room Brown_B5

Thematic Poster

Higher education

Higher education and research methodology

Keywords: Case studies,Qualitative methods,Assessment methods and tools,Student learning,Emotion and cognition,Social sciences,Higher education,Learning in context,Interdisciplinary,Communities of practice,Quantitative methods,Neuroscience,Lifelong learning,Comparative studies,Content analysis,Teaching/instruction,Social interaction,Engineering

Sig's: SIG 1 - Assessment and Evaluation,SIG 17 - Qualitative and Quantitative Approaches to Learning and Instruction,SIG 22 - Neuroscience and Education,SIG 4 - Higher Education

Chairperson: Georgios Athanassiou, University of Kassel, Germany

Problems posed to education research by the inability to access school sites

Case studies,Qualitative methods,Assessment methods and tools

Jori Beck, University of Nevada, Las Vegas, United States;

This proposal builds off of the work of two studies on urban teacher residency (UTR) programs conducted within the U.S. UTRs have an explicit mission to build relationships between institutions of higher education and school districts, yet the researcher conducting these investigations was prohibited from gathering data within the school district or from any school district personnel. Based on two yearsí worth of investigations into this program, the researcher describes how these access limitations inhibit student and preservice teacher learning; stunt relationship-building between universities and school districts; and weaken education research. Implications for education research as well as the 2015 Biennial Conference Theme are discussed.

Studentsí intentions to learning, teaching experiences and emotions: Towards ëa meeting of minds'

Qualitative methods,Student learning,Emotion and cognition,Social sciences,Higher education,Learning in context

Evangelia Karagiannopoulou, University of Ioannina, Greece; Noel Entwistle, The University of Edinburgh, United Kingdom;

The study explored the ways in which relational experiences between tutors and students appear to affect the quality of understanding reached by students. Studentsí intentions in learning and their experiences of teaching were compared, and the emotions related to them were explored. Sixteen in depth interviews were conducted with high achieving psychology students in their final year of a degree course. Studentsí emotions ranged from excitement to frustration depending on the extent their intentions were supported by their experiences with their tutors. Negative emotions and regression in learning were reported by students with the intention to change the self and the word, when they experienced tutors who simply transferred information. The study suggests ëa meeting of mindsí occurs where there is close learning relationship between tutor and students through which personal understandings are developed within a context where passion, excitement, concern about the studentsí personal and intellectual development and respect are experienced The findings are discussed in relation to recent literature suggesting the need for further research on the emotional reactions of students to their experiences with tutors.

Determining assessment quality at the programme level

Qualitative methods,Interdisciplinary,Higher education,Communities of practice

Liesbeth Baartman, Utrecht University of Applied Sciences, Netherlands; Frans Prins, Hogeschool Utrecht, Netherlands;

No adequate quality criteria and evaluation instruments exist to evaluate assessment quality at the programme level. Assessment programmes (APs) are deliberately designed combinations of assessment instruments for the entire curriculum. The purpose of this research is to develop quality criteria and an evaluation method for APs, and ensure its understandability and practical usability. Based on previous research into APs (e.g., Baartman et al. 2007; Boud, 2000; Dijkstra et al., 2012) a set of quality criteria (concerning validity, reliability, function, and conditions of the AP) as well as a self-evaluation method was developed for teacher/assessor teams. All quality criteria were worked out into a digital tool with 3-6 practical questions per criterion. Research questions were: (1) Are the quality criteria understandable, usable and complete? (2) Does the self-evaluation improve the quality of the AP? The quality criteria and self-evaluation were pilot tested in three teams in vocational education and one team in higher professional education. Results of the pilot study showed that most quality criteria were understandable and practically applicable. The teams reported that ìthinking in terms of APs" was new to them and provided insight in the connections between different single assessments in their curriculum. Based on these results, the quality criteria were improved. Using the improved self-evaluation, 72 teams in a large institute for vocational education evaluated their AP in 2013-2014. Results of this second implementation round will be presented at the conference.

Studying doctorsí brains: Using fMRI to investigate medical expertise

Quantitative methods,Neuroscience,Higher education,Lifelong learning

Ellen Kok , Maastricht University, Netherlands; Anique de Bruin, Maastricht University, Netherlands; Ide Heyligers, Maastricht University, Netherlands; Andreas Gegenfurtner, Maastricht University, Netherlands; Simon Robben, Maastricht University, Netherlands; Bettina Sorger, Maastricht University, Netherlands; Diana Dolmans, Maastricht University, Netherlands; Jeroen Van Merrienboer, Maastricht University, Netherlands;

Studying how (e.g., medical) expertise develops can provide important information for structuring and optimizing education. So far, expertise studies have mainly focussed on behavioural characteristics of experts, using observation, think-aloud or eye tracking methods. Functional magnetic resonance imaging (fMRI) is a new research method that has the potential to explore the neural basis of expertise development, which brings us closer to understanding crucial determinants of how expertise is made. The current study aims at investigating expertise development by examining differences in brain activation between beginning and advanced residents when solving two types of clinical cases (cases that elicit pattern recognition or reasoning) in two medical domains (radiology and surgery). All participants will solve 40 clinical cases specific to their domain of expertise while being scanned in a 3-T MRI scanner. In the round-table session, we will discuss the design of ecologically valid tasks that capture domain-specific expertise in a complex domain, while taking into account restrictions that fMRI research poses.

Localizing adaptations between pre-masterís thesis proposals and reports

Comparative studies,Content analysis,Qualitative methods,Assessment methods and tools,Social sciences,Higher education

Ati Raban, VU University Amsterdam, Netherlands; Judith Schoonenboom, University of Vienna, Austria;

Research execution is a complex process that we know little about. To gain insight in this process we compared thesis proposals and thesis reports of students in higher education. We developed a transparent method to localize changes to deal with findability and interpretations issues. By means of a grounded theory analysis we studied adaptations in theses of 21 premasterís students Teaching and Learning in Higher Education (TLHE). In the search for adaptations we differentiated between textual localization and conceptual localization. Textual analysis proved to be a real efficient method of localizing adaptations. Conceptual adaptations required identification of research components. We evaluated the findability of research components using an inductive method. A during analysis drafted list of signal words was the most used criterion for findability (in 40% of the cases). The two levels of analysis mutually informed each other, thus adding to the validity of our results. By explicating our used strategy and the usage of findability criteria the transparency of our results was enhanced. These findings confirm that it is possible to study student work inductively, but at the same time in a qualitative and transparent way.

Initiating the practice of producing a report in environmental engineering education

Qualitative methods,Student learning,Teaching/instruction,Social interaction,Engineering,Higher education

Janna Meyer-Beining, Gothenburg University, Sweden; Sylvi Vigmo, University of Gothenburg, Sweden; Ann-Marie Eriksson, Chalmers University of Technology, Sweden; Asa Makitalo, University of Gothenburg, Sweden;

From sociocultural and dialogical perspectives, an important element of student learning and enculturation into knowledge practices in HEI is to engage in producing texts such as essays, theses or reports. Such assignments are often initiated and followed through supervision by teachers who are experts in students chosen field of study. The main research question explored in this paper is how students are initiated to such practices of producing a report that are premised on a particular field in environmental engineering and hence anticipated as relevant for their future work. By selecting the very first session from a larger corpus of video recordings, this study aims to scrutinise how three supervisors and 14 international MSc students, using English as their lingua franca, manage in jointly establishing the aim and scope of producing such reports at initial stage, where language difficulties and asymmetries in competence and experience need to be bridged through face-to-face communication. From the analysis of their interaction we found that particular distinctions were made salient and used to move students to action (product vs process) but also metaphors were introduced and drawn on (Russian doll and arrow). We conclude by addressing the communicative functions of such resources in the studied supervision setting.

F 12

26 August 2015 15:45 - 17:15

Room Green_A1

Thematic Poster

Instructional design

Instructional design

Keywords: Experimental studies,Educational technology,Instructional design,Comprehension of text and graphics,Higher education,Multimedia learning,Mixed-method research,Social aspects of learning,Mathematics,Secondary education,Physical Sciences,Quantitative methods,Problem solving,Computer-assisted learning

Sig's: SIG 2 - Comprehension of Text and Graphics,SIG 6 - Instructional Design

Chairperson: Paul Ayres, University of New South Wales, Australia

Using PowerPoint in lectures: What explains the speech suppression effect?

Experimental studies,Educational technology,Instructional design,Comprehension of text and graphics,Higher education,Multimedia learning

Christof Wecker, Ludwig-Maximilians-Universitat (LMU), Germany;

Prior studies found a negative effect of computer-based slides on knowledge about information presented only orally. This study tested three explanations for this effect: (1) that simultaneous written and oral presentation of information might cause cognitive overload, (2) that learners may process information presented only orally less deeply in the presence of computer-based slides and thereby be less likely to fully comprehend individual sentences, and (3) that learners may process information presented orally equally well with and without computer-based slide projections, but simply regard the information presented only orally as ìsecondaryî and maybe less important. A 2x2-factorial design involving 128 students with the factors computer-based slides (no vs. yes) and type of note-taking (on empty sheets vs. on handouts) was employed. Learnersí cognitive load, processing of information presented only orally, and amount of note-taking about information presented only orally were measured. Knowledge was measured in a posttest comprising a free recall task and multiple-choice items. The negative effect of computer-based slides on knowledge about information presented only orally was replicated. No corresponding differences in cognitive load or processing of information presented only orally were found. However, the amount of note-taking about information presented only orally was significantly lower with computer-based slides than without computer-based slides. These findings support the explanation that computer-based slides may be associated with lower subjective importance of information presented only orally. Future research should focus on ways to overcome this negative effect by targeting learnersí suboptimal assignment of importance to information presented only orally.

Agency and authority in task design

Mixed-method research,Instructional design,Social aspects of learning,Mathematics,Secondary education

Carmel Mesiti, International Centre for Classroom Research, Australia; David Clarke, University of Melbourne, Australia;

In this presentation, we characterize tasks with respect to intention, action and interpretation to generate insight into student agency and voice. It is our contention that a written mathematical problem cannot be seriously discussed as a mathematical task without specification of the intended purpose, participants, and product. In addition, differences between social, cultural and curricular settings, together with differences between participating classroom communities, shape the performative realization of a mathematical task. This challenges reductionist attempts to characterize instructional tasks independent of these considerations. Given this contextual dependence, any commonalities across context carry significant weight. Central to an understanding of ìmathematical taskî as enacted in classroom settings is the social distribution of responsibility, agency and voice. Our analysis employed ëfunctioní as the combination of intention, action and interpretation to examine the functionality of mathematical tasks in classroom settings. Of particular interest were differences in the function of mathematically similar tasks when employed by different teachers, in different classrooms, for different instructional purposes, with different students. Our research shows that competent teachers in several countries utilize mathematical tasks in a way that maximizes student agency and voice. The valuing of agency and voice was evident in the classrooms of these teachers, rather than in any explicit articulation by them in classroom video data or in interview. In promoting high quality mathematical activity, the teacherís capacity to choreograph sophisticated classroom discourse was as important as the mathematical sophistication of the task statement or question.

The redundancy effect in artificial language word learning

Experimental studies,Instructional design,Comprehension of text and graphics,Multimedia learning

Gertjan Rop, Erasmus Univeristy Rotterdam, Netherlands; Jacqueline de Nooijer, Erasmus University Rotterdam, Netherlands; Peter Verkoeijen, Erasmus University Rotterdam, Netherlands; Tamara Van Gog, Utrecht University, Netherlands;

The multimedia effect states that combining verbal information with pictures fosters learning, but the redundancy effect shows that this does not apply when pictures are irrelevant or unnecessary for learning the verbal materials. Most research on these effects has focused on complex learning materials. The current study investigates in two experiments whether they also apply to learning object-manipulation words in an artificial language. A recent study showed that when right-handed participants studied object-manipulation words accompanied by a picture with a left-handed first-person perspective of the denoted action, learning was hampered compared to words accompanied by a right-handed perspective picture. This effect was explained by the authors as resulting from a mismatch between the mental simulation of the action based on the verbal information and the mental simulation evoked by the picture. However, we argue that it might also be explained as a redundancy effect, resulting from

unnecessary information capturing attention and working memory resources that, consequently, cannot be dedicated to learning relevant information. We tested this hypothesis in two experiments by comparing an incongruent-, congruent-, and no-picture condition while learning object-manipulation words in an artificial language. The incongruent pictures showed a different action, and, thus, were redundant, while the congruent pictures showed the action that matched the word to be learned. Results showed evidence of a redundancy effect, with incongruent pictures hampering word learning compared to congruent pictures. However, we found no evidence of a multimedia effect, that is, congruent pictures did not enhance word learning compared to no pictures.

Learning with animations and static pictures: The role of textual information about dynamic features

Experimental studies,Educational technology,Comprehension of text and graphics,Physical Sciences,Higher education,Multimedia learning

Sabrina Navratil, University of Mannheim, Germany; Tim Kuhl, University of Mannheim, Germany;

A crucial difference in the processing of animations compared to static pictures is that animations directly depict dynamic features like changes in velocity, so that this dynamic information can be simply read-off. In contrast, when learning with static pictures these dynamic features have to be inferred by the learner, in particular if this information is not conveyed by an additional external source such as text. One may argue that the instructional advantage of an animation, specifically to directly depict dynamic features, might become less important if this information is given in the corresponding text, but becomes especially important when the information is not given in the corresponding text. In line with this argumentation, in two previous experiments it was found that animations were superior to static pictures only when the information about dynamic features was not explicitly given in the text. Besides, in both experiments it was found that learning with visualizations and text was superior to learning with only text (multimedia principle). The two major aims of the current experiment are: 1) Replicating the findings of the two experiments, thereby showing the interaction of visualization format (animation vs. static pictures) and textual information (dynamic information vs. no dynamic information). 2) Investigating by means of eye-tracking to what extent the processing of animations compared to static pictures varies as a function of textual information and how this contributes to learning success. Data collection is in progress. The complete results will however be available for the conference.

Does the issue matter? Personalization effects in neutral and emotionally loading learning material

Experimental studies,Quantitative methods,Educational technology,Instructional design,Multimedia learning

Maria Reichelt, Bauhaus-University of Weimar, Germany; Steffi Zander, Bauhaus-Universitat Weimar, Germany;

The personalization principle is a design recommendation for multimedia learning. It assumes that instructions using personalized language (e.g., possessive pronouns or directly addressing learners) promotes motivation and learning better than those using formal language (Mayer, 2009). The effectiveness of this principle has been examined primarily with scientific issues (e.g., botany or astronomy). Only few studies have used a non-neutral (e.g., emotionally loading) topic for testing the personalization principle. Therefore, this study (N=265) systematically compared neutral and emotional issues (statistical analysis, child labor) in a personalized and formal version of a computer-based program (2x2-design). The results showed no interaction effect between the factors personalized language and thematic stimuli. Theoretical and practical implications will be discussed at the conference.

Effects of Self-Explanations on Studentsí Performance in Concept Learning Tasks

Experimental studies,Instructional design,Problem solving,Computer-assisted learning

Lugain Khalifah, Technische Universitat Dresden, Germany; Hermann Koerndle, Technische Universitat Dresden (Dresden University of Technology), Germany; Susanne Narciss, Technische Universitat Dresden, Germany; Claudia Prescher, Technische Universitat Dresden (Dresden University of Technology), Germany;

Providing students with informative tutoring feedback (ITF) has proven to be beneficial for increasing studentsí performance and motivation in identifying conceptual rules (Narciss, 2004). To investigate the effects of ITF Narciss used Brunerís (1956) experimental concept formation tasks because they are a) relatively independent from context and prior knowledge, b) require students to apply complex problem solving strategies, and c) provide students with the opportunity to identify and revise concrete errors. The study was set in a computer-based learning environment that required participants to solve 10 conjunctive-disjunctive concept learning tasks, which were designed according to Narciss (2004). According to Bourne et al. (1969), students who use both, positive and negative instances (= complete strategy) outperform students who focus only on positive instances (= incomplete strategy). Thus, the ITF-strategy of Narciss (2004) included a hint to use the complete strategy, and was successful in fostering studentsí performance and motivation. Based on these findings and on findings regarding the benefits of encouraging students to actively provide self-explanations during concept learning (e.g., Chi, 2008), this study aims at contributing empirical findings to the following research questions: (a) Do students who are encouraged to self-explain their incorrect hypothesis regarding conceptual rules use the complete strategy more frequently? (b) How does using the complete strategy relate to performance? (c) Does self-explaining incorrect hypotheses have an impact on concept learning performance? The results showed that encouraging students to self-explain fosters the use of effective solutions strategies as well as performance in the concept learning tasks.

F 13

26 August 2015 15:45 - 17:15

Room Brown_B1

Thematic Poster

Mathematics education

Mathematics education and science education

Keywords: Psychometrics,Neuroscience,Cognitive development,Numeracy,Mathematics,Primary education,Experimental studies,Student learning,Conceptual change,Quantitative methods,Instructional design,Science education,Informal learning,Secondary education,Cognitive skills,Problem solving,Comparative studies,Teaching/instruction,Competencies,Assessment methods and tools,Higher education

Sig's: SIG 11 - Teaching and Teacher Education,SIG 2 - Comprehension of Text and Graphics,SIG 22 - Neuroscience and Education,SIG 3 - Conceptual Change,SIG 4 - Higher Education,SIG 6 - Instructional Design

Chairperson: Konstantinos Christou, University of Western Macedonia , Greece

Number estimation in children assessed with a no-number-line estimation task

Psychometrics,Neuroscience,Cognitive development,Numeracy,Mathematics,Primary education

Beatriz Vargas Dorneles, Universidade Federal do Rio Grande do Sul, Brazil; Mariana Lima Duro, UFRGS, Brazil; Simone Nascimento dos Santos, UFRGS, Brazil; Nelba Maria Teixeira Pisacco, UFRGS, Brazil; Yasmini Lais S. Sperafico, UFRGS, Brazil; Jacqueline Raquel B. Enricone, UFRGS, Brazil;

Number estimation is part of the number sense. Some studies involving distance-estimation, quantity of money and numbers in a number line indicate that children and adolescents have a limited capacity to make accurate estimations. Specifically, Halberda and Feigenson (2008) described the Approximate Number System (ANS) as being limited in the early years and improving over time. There is some evidence that ANS is correlated with mathematical achievement and predicts mathematical ability two years hence. Most number-estimation research has employed number line estimation tasks in which children are asked to indicate the position of a target number on a blank number line. By contrast, because number line estimation tasks are not used in Brazilian schools, we developed an estimation task in which children estimated a quantity by observing a group of dots that appeared on a computer screen. Brazilian public school students (n=169), aged 7 to 14 years (52.7% girls and 47.3% boys), were evaluated using a three-level series of tasks designed to assess the capacity to estimate number quantities. After a pairwise comparison, we concluded that this version of the task could discriminate the first and second levels of the ability to estimate numbers but could not adequately discriminate the third level. In other words, despite the fact that 2nd and 3rd grade children presented an improved capacity for estimation, children in the 4th, 5th and 6th grades obtained similar scores in levels 2 and 3.

The inverse relation principle in division: A study with Brazilian and Portuguese students

Experimental studies,Student learning,Conceptual change,Numeracy,Mathematics,Primary education

Beatriz Vargas Dorneles, Universidade Federal do Rio Grande do Sul, Brazil; Isabel Cristina P. Vasconcelos, UFRGS, Brazil; Ema Paula Botelho Costa Mamede, Universidade do Minho, Portugal;

This study compares Brazilian and Portuguese studentsí performance when solving problems to establish the inverse relation between quantities. This ability to establish the inverse relation between quantities is necessary for obtaining a conceptual knowledge of fractions. Singler, Thompson and Schneider (2011) point out that learning fractions requires a reorganization of numerical knowledge and many properties that are true for integers, but are not true for numbers in general. The concept of quantity represented by a rational number requires an understanding of the relationship between size of n and n parts. There is some evidence that children can benefit from pondering the relationships between quantities before learning about the numerical representations related to sizes of fractions (SINGLER et al., 2011). We conducted a study with 4th grade students, before they were taught fractions, to examine their understanding of the inverse relation between size of n and n parts for the conceptual understanding of fractions. Ninety Brazilian and 73 Portuguese public school students participated in the study. After a comparison analysis on the performance of the two student groups, we concluded that there are important differences between the groups and the Portuguese student group performed better. Both groups of students showed better performance in understanding the inverse relation between size of n and n parts in fraction problems than in division problems.

Supporting studentsí scientific literacy in the museum: Exhibition, open science lab, or both?

Quantitative methods,Instructional design,Cognitive development,Science education,Informal learning,Secondary education

Katrin Neubauer, TUM School of Education, Germany; Maximilian Knogler, Technische Universitat Munchen (TUM), Germany; Doris Lewalter, Technische Universitat Munchen (TUM), Germany;

Scientific literacy is considered to be the major goal of science education. In considerable contrast to this goal stands a recurring criticism based on significant declines of studentsí interest during their school career and mediocre competences regarding the use and transfer of scientific knowledge of high school students. Due to their specific characteristics, museums may provide an additional and powerful context to adequately support studentsí scientific literacy and complement classroom-based instruction. The present study therefore explores the potential of different learning environments in a museum context in their capacity to foster high school studentsí scientific literacy. It systematically investigates changes in studentsí subjective knowledge and their situational interest related to four different interventions based on single treatments and treatment combinations of an exhibition visit and a science lab visit around the topic of nanotechnology. Participants were 273 high school students. Findings revealed significant changes in studentsí subjective knowledge related to the two single treatments

(science lab or exhibition) which were more pronounced in the science lab condition. Substantial changes were also found for the combined treatments. Furthermore, science lab and exhibition yielded medium levels of situational interest. The results indicate a considerable potential of museums to support studentsí scientific literacy.

Making a problem model in arithmetic word problem solving depends on the updating function

Experimental studies,Instructional design,Cognitive skills,Problem solving,Mathematics,Primary education

Kanetaka Mori, Osaka Prefecture University, Japan; Masahiko Okamoto, Osaka Prefecture University, Japan;

Recently, some researchers reported updating function of working memory relates the performance of arithmetic word problem. It was also reported that updating is important in integration process. However, it is unclear whether making a problem model depends on updating function. If making a problem model depends on updating, a problem model between high updating problem solvers and low updating problem solvers could be different. The purpose of this study is to reveal making a problem model depends on updating function. Fifty-four college students were divided into four groups with phonological- and visual-updating task score. They solved arithmetic word problems with or without extraneous information. They were instructed to perform a lexical decision task after reading a word problem. Lexical decision task had three word conditions: necessary word condition, extraneous word condition, and novel word condition. Priming effect in the lexical decision task was calculated by subtracting reaction times of necessary or extraneous word from reaction times of novel word. This was analyzed with three-way ANOVA for phonological-updating (high vs. low), visual-updating (high vs. low), and target word type (necessary word vs. extraneous word). The results showed a significant secondary interaction effect of these three factors. This indicated that in high visual-updating group problem solvers with high phonological-updating made a problem model which included only necessary information, while they with low phonological-updating made it which included both necessary and extraneous information. Findings suggested making a problem model depends on participantís updating function.

A comparative study about mathematical learning methods: The ABN method and the CBC method

Comparative studies,Student learning,Teaching/instruction,Competencies,Numeracy

M. Carmen Canto, University of Cadiz, Spain; Manuel Antonio Garcia, University Cadiz, Spain; Jaime Martinez, University Cadiz, Spain;

This study compared two different mathematical teaching-learning methods: the closed calculation Based on Ciphers (CBC) and the open Algorithm Based on Numbers (ABN). The aim of this preliminary study is to compare the scores obtained by Spanish and Finnish students in written calculation, mental arithmetic, numeracy and problem solving tasks, using the CBC

and ABN methods. Three groups of children aged from 7 to 8 years old participated on this study: one experimental group (ABN method) from Spain and two control groups (CBC method) from Spain and Finland. A total of 66 participants were randomly assigned two 3 groups. 22 students second grade to the experimental group, and 20 second grade students for each control group. Results verified that students who used the calculation ABN method achieved higher on mental arithmetic, operations and problem solving than those who followed the CBC method. The experimental group obtained significantly higher scores in mental calculation, written calculation and numeracy respect to the two control groups, but the Finnish control group obtained higher scores in problem solving tasks comparing to the Spanish control and experimental groups. These findings illustrated that the ABN method could improve the mathematical learning in mental calculation, written calculation and numeracy. But it should require developing a better procedure to improve the problem solving. However, future studies on the current topic and with these variables are therefore recommended.

Pre-course tutoring & rehearsal learning: Impacts on mathematic performance as a function of gender

Quantitative methods,Assessment methods and tools,Student learning,Competencies,Mathematics,Higher education

Nora Doermann, Goethe-Universitat Frankfurt, Germany; Julia Boser, Goethe-Universitat Frankfurt, Germany; Julia Mendzheritskaya, Goethe-Universitat Frankfurt, Germany;

Methodological skills in mathematics are crucial for successfully graduating in Economics. Therefore many German universities offer their freshmen pre-courses in mathematics prior to the lecture period. Their goal is to repeat knowledge in mathematics which has been acquired at school and is crucial when visiting lectures for undergraduate students. At the same time there is little evidence on the effectiveness of such learning formats and increase of participantsí mathematic performance. Thus, our study focuses on the impact of active learning environments (pre-course tutoring) and rehearsal learning strategies on mathematic performance in first-year students. Additionally, we assume that studentsí benefit from those offers varies in function of their gender. We also postulate that studentsí learning success is related to the gender of their tutor. The results confirm the proposed association between rehearsal learning strategies and increase in learning outcomes in pre-course participants. However, subject to their gender, students did not benefit more from participating in pre-course activities. With regard to tutorsí gender, a descriptive analysis of the data indicates that female students learned even more when attending a male tutorís pre-course and vice versa. For the purpose of analyzing this phenomenon, further data is being collected. These results can be useful for developing even more effective learning environments for first-year students and understanding the terms of studentsí individual academic success.

F 14

26 August 2015 15:45 - 17:15

Room Brown_B2

Thematic Poster

Metacognition and reflection

Metacognition and reflection

Keywords: Experimental studies,Researcher education,Metacognition,Social sciences,Higher education,Psychometrics,Student learning,Competencies,Reflection,Professions and applied sciences,Mixed-method research,Pre-service teacher education,Peer interaction,Self-regulation,Achievement,Biology ,Science education,Emotion and cognition,Primary education

Sig's: SIG 14 - Learning and Professional Development,SIG 16 - Metacognition,SIG 8 - Motivation and Emotion

Chairperson: Alexander Minnaert, University of Groningen, Netherlands

A short intervention to promote evaluativistic epistemological beliefs in psychology students

Experimental studies,Researcher education,Metacognition,Social sciences,Higher education

Tom Rosman, Leibniz-Institute for Psychology Information (ZPID), Germany; Anne-Kathrin Mayer, Leibniz-Institute for Psychology Information, Germany;

In an effort to foster evaluativistic epistemological beliefs in psychology students, a small-group intervention was conceptualized. It aims at conveying the ideas that existing psychological theories might be challenged by further research, that contradictions between different theories are fruitful for theory development, and that, due to varying empirical evidence and argumentative quality, context-dependent weighting of different theories regarding their value is nevertheless possible. The 90-minute-intervention consists of the discussion and reflection of six pairs of texts containing short descriptions of studies that present controversial evidence for a certain theory. This ìreflection phaseî will be complemented by short summaries (presented by the group instructor) explicitly focusing the three ideas presented above and instructing students on how to deal with controversies in empirical research. In a field-experimental pretest-posttest-follow-up study with two control groups (a no treatment control group, and a group receiving an intervention fostering learning strategies), specific effects of the epistemological intervention are expected on epistemological beliefs, study satisfaction, and sophistication of information behavior. The study is currently underway; results will be presented and discussed in the poster.

Promoting self-reflection skills in higher education: Scale development

Psychometrics,Student learning,Competencies,Reflection,Professions and applied sciences,Higher education

Sonja Markwalder, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland; Elisabeth Muller, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland;

This poster focuses on (self-) reflection as a key competence in innovative societies and therefore as a current issue in higher education. If a reflective society is based on (self-) reflective individuals willing to permanently acquire and improve their competencies, then higher education needs to promote (self-) reflection and formulate a clear concept of (self-) reflection as a learning objective. The poster presents a conceptual framework and the process involved in developing a self-reflection measuring scale. This scale will enable students to self-assess the development of their (self-) reflection skills. At the same time, the scale can be used by higher education institutions to evaluate if the targeted educational goals have been achieved. The poster proceeds in three methodological steps. First, test items are drawn from the relevant literature, from a previous study, and from discussion groups with practitioners. Second, the collected test items are examined and analyzed in pre-tests. Third, the selected items are verified in a longitudinal study.

Effects of "women's hevruta learning" on the development of metacognitive strategies

Mixed-method research,Pre-service teacher education,Student learning,Metacognition,Peer interaction,Higher education

Mary Gutman, Efrata College, Israel; Esty Teomim-Ben Menachem, Efrata College, Israel;

Women who engage in collaborative learning in religious study contexts have been found to engage in unique metacognitive practices (Teomim-Ben Menachem, 2013), however, such learning in academic contexts has not been investigated. This study's primary goal is to investigate metacognitive interaction between women during their collaborate writing of a research paper. "Hevruta learning" is defined as a learning meeting between two (or more) persons with a text (Jaffe, 1992) usually related to Jewish religious studies. While the nature of hevruta learning has been studied among men (Stampfer, 2005), little attention has been focused on women. This study investigates how teaching and academic experiences influence metacognitive strategies in the "hevruta learning" context. We hypothesize that women who are experienced teachers have a high ability level to transfer their academic or professional metacognitive strategies to collaborative "hevruta learning" (Segal, 2004). The development of metacognitive strategies (planning and goal setting, monitoring, debugging during the research process, and evaluating) (Brown, 1987) of participants (n=98) was examined in mixed hevrutas (career change students- CCS and veteran practitioner students- VPS) and non-mixed hevrutas (CCS, VPS, or pre-service students- PSS), and in different hevruta contexts (individual work-I, interpersonal sessions-OTHER, long distance task- IT). Findings showed a generally significant contribution of mixed hevrutas on the debugging strategy, and a significant contribution of non-mixed hevrutas on the planning strategy development at OTHER context.

Using eye-tracking to investigate the effects of disfluency on metacomprehension

Experimental studies,Student learning,Metacognition,Self-regulation

Christoph Mengelkamp, University of Wuerzburg, Germany; Elisabeth Pieger, University of Wuerzburg, Instructional Media, Germany;

Monitoring and control are components of metacognition that interact with each other. Monitoring is defined as ìsubjective assessment of one/s own cognitive processes and knowledge, whereas con-trol refers to the processes that regulate cognitive processes and behaviorî (Koriat, Maíayan, & Nussinson, 2006, p. 38). Often a sequential structure is implied: monitoring has an influence on control which influences performance. However, monitoring and control are interactive: monitoring affects control (monitoring-based control), but also is affected by control (control-based monitor-ing). Yet, there are only few studies investigating these interactions and therefore the aim of our study is to investigate the interplay of these constructs. Disfluency seems to be one way to influence control and monitoring. This claim is supported by the cue utilization approach (Koriat, 1997) in which fluency is mentioned as a cue for metacognitive judgments. If students learn with a disfluent text that is hard to read, they may judge it as difficult to learn (Ease of Learning Judgment). Further disfluent text may require more effort and deeper processing (control) which can be measured using eye-tracking. Because of higher effort for reading disfluent texts students may predict lower per-formance (Judgment of Learning). As studies show that students are often overconfident in their judgments, disfluency should reduce this overconfidence and lead to more accurate judgments. When rereading the text a second time this more accurate judgments should lead to adequate moni-toring-based control which again can be measured by eye-tracking. As a result the performance in a final knowledge test should increase.

Impact of a SRL-guide and a deep-level seminar on studentsí judgment of learning and performances

Experimental studies,Achievement,Metacognition,Biology ,Science education,Higher education

Marion Crauwels, KU Leuven, Belgium; Patrick Van Dijck, KU Leuven, Belgium; Ilya Lebeau, KU Leuven, Belgium; Carla Schramme, KU Leuven, Belgium; Sofie Baeten, KU Leuven, Belgium; Daan Moechars, KU Leuven, Belgium; Peter Roels, KUL, Monitoraat Wetenschappen, Belgium; Carolien Van Soom, KU Leuven, Belgium;

This pilot-study investigates the effects of a self-evaluation Self-Regulated-Learning (SRL) guide and a ëdeep-level understandingí seminar on studentsí judgment of learning and achievement levels in cell biology and biochemistry. The participants are first-year university biology students. In the experimental condition students were provided with a self-evaluation SRL-guide combined with a ëdeep-level understandingí seminar (SRL + SEM), while in the control condition students received a blind-guide and did not participate in a ëdeep-level understandingí seminar (no SRL + no SEM). We hypothesize that if students reflect on their performances, apply a self-evaluation SRL-guide to specifically select the SRL variables required for their personal situation combined with participating in a ëdeep-level understandingí seminar, studentsí learning outcomes will improve.

Confusion and math problem solving in elementary school students

Emotion and cognition,Metacognition,Self-regulation,Primary education

Ivana Di Leo, McGill University, Canada; Krista Muis, McGill University, Canada;

All students experience emotions while learning. Positive emotions that arise, i.e., curiosity and enjoyment, may lead to better learning strategies and academic outcomes. Alternatively, negative emotions, i.e., frustration and confusion may lead to disengagement and poorer academic outcomes. The purpose of this study was to examine the temporal dynamics of emotions experienced by fifth-grade students during complex mathematics problem solving. We were interested in exploring specifically what emotions students experience while solving a complex mathematics problem and what learning strategies are adopted immediately following these emotions. Additionally, we aimed to investigate whether other emotions are experienced following one particular type of emotion and whether discernable patterns of emotions exist. This study's results provide evidence that both value and control are important antecedents. This study's results demonstrated that confusion negatively predicted shallow cognitive strategies, suggesting that elementary students do not possess the learning skills necessary to resolve their confusion when it arises during complex problem solving. Moreover, when confusion did arise students did not increase their use of metacognitive strategies to reduce confusion, and when confusion persisted, they disengaged, and frustration and boredom ensued. As such, interventions should be developed to promote the necessary skills to overcome confusion in positive ways.

F 15

26 August 2015 15:45 - 17:15

Room Brown_B6

Thematic Poster

Social interaction in L&I

Social interaction in L&I

Keywords: Qualitative methods,Student learning,Emotion and cognition,Reflection,Social aspects of learning,Social interaction,Content analysis,Secondary education,Quantitative methods,School effectiveness,Social development,Out-of-school learning,Primary education,Cultural diversity in school,Special education,At-risk students,Peer interaction,Teaching/instruction,Vocational education,Video analysis,Reflective society,Parental involvement in learning

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 14 - Learning and Professional Development,SIG 15 - Special Educational Needs

Chairperson: Horst Biedermann, University of Salzburg, Austria

Childrenís responsiveness to place: Deploying Vygotskyís concept of perezhivanie to analyse learning

Qualitative methods,Student learning,Emotion and cognition,Reflection,Social aspects of learning,Social interaction

Peter David Renshaw, The University of Queensland, Australia; Ron Tooth, The University of Queensland, Australia;

This paper examines the relevance of Vygotskyís concept of perezhivanie to environmental education. It is well-known that Vygotsky conceived of development as a cultural process occurring through engagement in social contexts such as play and effective teaching in the ZPD. He also proposed in his writings on art and drama that development can occur through perezhivanie, which is translated as emotional experience, or lived experience characterised by a unity of cognition and emotion. We have found that place-responsive pedagogies can evoke emotional and heartfelt responses from children, but environmental educators often downplay the relevance and importance of emotional responsiveness, preferring to focus childrenís attention on the cognitive and scientific aspects of the experience of ënatureí. We draw upon childrenís written accounts of their experiences during an excursion to a forest reserve in order to identify moments of perezhivanie. We propose that perezhivanie includes both heightened personal experiences and meta-experiences involving reflection, reinterpretation and re-visioning of their identities and futures. Environmental educators might deploy perezhivanie in the design of place-pedagogy by considering: (i) ways to heighten studentsí engagement, attentiveness and responsiveness to natural settings; as well as (ii) strategies to facilitate their reflection on, and communication of, their experiences to self and others.

Studentsí strategic and tactical behavior

Content analysis,Qualitative methods,Student learning,Social aspects of learning,Social interaction,Secondary education

Sarah Forster-Heinzer, University of Zurich, Switzerland; Horst Biedermann, University of Salzburg, Austria; Roland Reichenbach, University of Zurich, Switzerland;

Being successful at school is an important goal of most students. Learning is one possible strategy to achieve this goal, especially in terms of good grades. But, as research shows, other strategies exist as well. This paper attempts to study studentsí strategic and tactical behavior as an important element of being successful. In this regard, strategic and tactical behavior is not discussed from a moral perspective. Nor is it denounced as reprehensible but as a valuable social skill. By means of an exploratory qualitative interview study with students of differing ages and school levels, we identified various strategies, tactics, and differences regarding a developmental perspective. First results show that students use different strategies and tactics to adapt their behavior to teachersí anticipated expectations. But not all students succeed equally in their adaptive behavior. From this conceptual perspective, being ìprivilegedî regarding learning processes at school means to profit from more suitable possibilities than others in entertaining meaningful pedagogical relationships. Strategically successful students use their (social) skills to

anticipate teachersí expectations and adapt their behavior in accordance with characteristics of persons and situations. Therefore, this study on classroom interactions is not only relevant for teachers and teaching education institutes but also regarding the problem of socially disadvantaged children.

Does Extended Education Reduce Behavioral Problems? An Examination of All-Day Schools in Switzerland

Quantitative methods,School effectiveness,Social development,Out-of-school learning,Primary education

Lukas Frei, University of Berne, Switzerland; Marianne Schuepbach, University of Bamberg, Germany;

During the past decade, all-day schools in Switzerland have been more widely established. All-day schools refer to schools, which do not only offer regular school hours, but also provide education and care during the rest of the day. Those additional services, defined as extended education, generally include lunch, a supervised program in the afternoon, and, less frequently, before-school care. Since all-day schools provide opportunities to develop positive relationships in a structured and supervised environment, they are met with high societal and academic expectations regarding the development of social skills in children, including the reduction of behavioral problems. Few studies have tested this assumption so far, providing heterogeneous results. This contribution aims to add to this research by using data from the ongoing longitudinal research project ìEduCare-TaSe ñ All-Day School and School Success?î to explore the impact of extended education on behavioral problems. EduCare-TaSe contains a sample of approximately 1í800 first- to second-grade primary-school children from 120 classes and 53 day-schools in the German-speaking part of Switzerland. About 30% of the children in our sample are enrolled in extended education services, resulting in a quasi-experimental design. Class teachers are to evaluate behavioral problems once during first-grade (Summer 2014) and again approximately 6 months later during second-grade. Additional information, including family income, parental education, and migration background are also controlled for. We expect participation in extended education services to have a positive influence (i.e. less conduct problems or a smaller increase in conduct problems) on behavioral problems, compared to the control group.

Predictors for peer acceptance in inclusive classrooms

Quantitative methods,Cultural diversity in school,Special education,At-risk students,Peer interaction

Stefanie Brimmers, TU Dortmund University, Germany; Anna Suedkamp, TU Dortmund University, Germany; Sarah Lange, University of Dortmund , Germany; Sylvia Mira Wolf, University of Dortmund, Germany; Heinrich Troester, University of Dortmund, Germany;

Over the last years the German school system has been developing from mostly separate education for children with special educational needs (SEN) to a more inclusive school system,

where students with SEN are educated in heterogeneous classrooms among students without SEN, as well as students with different cultural backgrounds. Research on the topic of social acceptance showed that children with SEN as well as immigrant students are at risk of being less accepted by their peers. In this study, we examine if studentsí social skills and academic achievement are important for peer acceptance in inclusive classrooms. The peer acceptance of N = 741 students in inclusive classrooms was measured by sociometric peer nominations; their social skills and school performance were rated by their teachers. Results show that children with SEN are less accepted by their peers while immigrant students are equally accepted compared to their local peers. Furthermore, social skills are a moderate predictor for peer acceptance whereas academic achievement is a rather weak predictor. The results indicate that the establishment of social relations is a major challenge for students with SEN in inclusive classrooms. Fostering studentsí social skills seems to be a promising approach to enhance studentsí peer acceptance.

Savvy teaching ñ An analysis of the interdependency of instructional features and learning outcomes

Quantitative methods,Teaching/instruction,Social interaction,Vocational education

Eva Hopfer, University of Zurich, Switzerland; Andrea Reichmuth, University of Zurich, Switzerland;

To date, only little is known about instructional features fostering learning outcomes as learning-achievement and learning-motivation in commercial vocational education and training (VET) schools. These learning outcomes are especially important for its subject of ëEconomics & Societyí (E&S), as it aims at developing economic competence and motivation for life-long learning, both requirements for skilled employees. To foster the understanding of the interdependencies between instructional features and learning outcomes in E&S, 1278 commercial apprentices were assessed regarding their perception of instructional features and their development of learning outcomes (learning-motivation and economic competence). Apprentices were grouped into four distinct clusters according to their development in learning-motivation and economic competence. The analysis and comparison of the clustersí perception of instructional features reveal differences across clusters. For example, apprentices with a learning-motivation orientation perceive cognitive-activation and constructive-learning-support significantly stronger than apprentices without such an orientation. These initial results hint at the existence of interdependencies between instructional features and learning outcomes. A further elaboration of these results is important to contribute to the research of teaching and learning in the field of E&S-instruction. Ultimately, synergies between the studyís results and future teaching and learning can be used to improve E&S-instruction effectiveness for the benefit of teachers and apprentices.

The homework trap: How to improve the quality of parent-child interactions in homework situations

Quantitative methods,Video analysis,Reflective society,Parental involvement in learning,Social aspects of learning,Out-of-school learning

Lea Arenz, Ludwig-Maximilians-Universitat (LMU), Germany; Mechthild Schafer, University of Munich (LMU Munich), Germany;

Parental involvement in their childrenís learning process can be straining for parent-child-relationships, with the homework situation being particularly problematic. This is especially true for parents and children with behavioral problems (Toney, Kelley, & Lanclos, 2003). This study examines whether the quality of problematic parent-child-relationships during a homework situation can be improved through parental training via video analysis and behavioral therapeutic methods. It will also be the first study to combine Tronickís Mutual Regulation Model (MRM) (1989; 2011) and the Munich Training Model (MTM) (Innerhofer, 1977), making it possible to evaluate the quality of restructured parent-child-relationships with regard to a potentially improved interactional fit on the basis of operant conditioning. For the intervention study design, observational data are being gained through video recordings of mother/father-child-dyads (experimental group: N = 50; control group: N = 50) during a standardized homework situation. The quality of interactions is coded by an adaptation of the ICEP (Reck, C., Noe, D. & Cenciotti, F., 2009) which is based on the MRM. The operant conditioning underlying the MTM is coded by an adaptation of the MTM coding manual (Innerhofer, 1977). The sequences are unitized by use of event sampling. As the coding of the videos is still in progress, no data are available yet for further conclusions concerning the research questions. However, pre- and post-ANOVAs will be conducted on the data once the coding has been completed. The interactional restructuring as an intervention underlines the crucial role social interaction plays during a childís learning process.

F 16

26 August 2015 15:45 - 17:15

Room Brown_B3

Thematic Poster

Teacher professional development

Teacher professional development

Keywords: Qualitative methods,Quantitative methods,Pre-service teacher education,Teacher professional development,Competencies,Computer-assisted learning,Case studies,Teaching/instruction,At-risk students,Social interaction,Mathematics,Motivation and emotion,Mixed-method research,Second language acquisition,Language (Foreign and second),Reflection,Social sciences,Higher education,Meta-analysis,Reflective society,Professions and applied sciences,Workplace learning,Interdisciplinary,Secondary education,Learning in context

Sig's: SIG 11 - Teaching and Teacher Education,SIG 14 - Learning and Professional Development

Chairperson: Wilfried Admiraal, Leiden University, Netherlands

Fostering diagnostic skills via tablet PCs? Two approaches to develop teachersí diagnostics

Qualitative methods,Quantitative methods,Pre-service teacher education,Teacher professional development,Competencies,Computer-assisted learning

Carolin Ramsteck, University of Education Schwabisch Gmund, Germany; Sandra Baskiewicz, University of Education Schwaebisch Gmuend, Germany; Uwe Maier, University of Education Schwaebisch Gmuend, Germany;

Even though German test-based school reforms have been in progress for one decade, current empirical research still detects considerable deficits in the usage of state-wide mandatory proficiency tests (in Germany they are called ìVergleichsarbeitenî, in short: VERA). In spite of these findings, teachers still have not been supported in the perception and usage of feedback data they get from proficiency tests. Moreover, teachersí diagnostic competencies as well as the use of formative assessment ñ both closely linked with test data usage ñ are also not in the foci of teacher training and professional development. The present paper addresses two attempts, how (future) teachers can be enabled practically to proceed with test data more intensely. Both projects focus on enhancing teachersí diagnostic competencies as well as increasing the understanding and usage of formative assessment by means of computer-based approaches. They differentiate in their target groups (teachers with teaching experience vs. future/novice teachers). We want to introduce the common theoretical background of the two projects as well as their designs and approaches. At the moment, the projects are still in the phase of data collection. First results are expected for summer 2015.

Teacherís mindset in interaction: Teaching mathematics to low-achieving students

Case studies,Teaching/instruction,At-risk students,Social interaction,Mathematics,Motivation and emotion

Elina Kuusisto, University of Helsinki, Finland; Inkeri Rissanen, University of Helsinki, Finland; Eija Hanhimaki, University of Helsinki, Finland; Kirsi Tirri, University of Helsinki, Finland;

This study examines what kind of implications teacherís mindset has on teacher-student interaction in the classroom. Mindsets are beliefs individuals hold about their most basic qualities and abilities (Dweck 2006). In a growth mindset, people believe their brain, intelligence, abilities and talent can be developed, while people with a fixed mindset believe their basic qualities, such as intelligence and abilities are static, and cannot be developed. Fostering the development of studentsí growth mindset enhances learning, and affective interventions for students have been developed (Dweck 1999, 2006; Farrington et al 2012) but little is known of how teachersí mindset affects studentsí learning (Farrington et al. 2012). This qualitative case study focused on one growth mindset teacher and one fixed mindset teacher, selected among recipients of a quantitative survey measuring mindsets. The data includes pre-interviews with the teachers, classroom observations and stimulated recall interviews. Our results show how mindset is reflected in teachersí ways of 1) motivating and encouraging the students 2) introducing new

topics, materials and tasks to students 3) giving guidance and help to students while they are working on their tasks 4) inquiring what the students have learned 5) giving feedback to students 6) explaining and commenting their students successes and failures. Altogether, the study demonstrates many ways in which teachersí implicit mindsets continuously affect studentsí mindsets and brings forth the need for more research on how teachersí mindsets affect students and how teachersí growth mindset can be developed in teacher education.

Newly qualified L3 teachers: (Pedagogical) content knowledge and curricular intentions

Mixed-method research,Pre-service teacher education,Second language acquisition,Language (Foreign and second)

Eva Thue Vold, University of Oslo, Norway;

The aim of this study is to investigate how newly qualified foreign language (L3) teachers perceive the relevance of the content of their university language teacher education programs in relation to the academic demands they meet in their professional practice as L3 teachers in Norwegian secondary schools. The study uses a mixed-methods approach comprising qualitative semi-structured interviews with newly qualified L3 teachers and a larger quantitative survey. The preliminary findings indicate that the informants in general feel well prepared for their teaching practice, but that this feeling stems not only from their university studies, but also from their stays abroad. In particular, the informants emphasize the value of these stays for the development of their oral language skills and for their knowledge about everyday culture in the target language area, which both are central issues in the current school curriculum. These issues, however, were not adequately dealt with in their university studies. The findings thus point towards a certain discrepancy between the university foreign language studies on the one hand, and curricular intentions and language classroom realities on the other. This means that in order to fulfil the requirements of the school curriculum, the foreign language student teachers need to supplement their education with other components, e.g. with stays in the target language area. The findings from this study may provide a basis for developing language teacher education programs which are more fully in line with the needs of society, schools and students.

Scaffolding and use of rubrics for the analysis of pre-service teachersí practices in the practicum

Case studies,Qualitative methods,Pre-service teacher education,Reflection,Social sciences,Higher education

Tatiana Lopez Jimenez, University of Barcelona , Spain; Rosa Colomina, Universidad de Barcelona, Spain;

This study characterizes the scaffolding processes in individual tutorials where the practice of pre-service teachers is analysed by using rubrics. Scaffolding is approached from a socio-cultural perspective (Engin, 2013; Wood, Bruner, & Ross, 1976) in the frame of joint activity built by the participants (Coll, 2001), and on the analysis of teaching practice (Korthagen, 2001; Shon, 2010). Two cases were studied (Stake, 2010) in which two university tutors and two pre-service

teachers participated during the practicum. A total of 13 tutorials were registered on video. The data was analysed following the analysis joint activity model (Coll, Colomina, Onrubia, & Rochera, 1992). The results show, first, the tutorials structure in different forms of activity organization, aiming at different instructional goals: analysis of the practice itself, the assessment of teaching performance, and a projection towards future work performance of the student as a teacher. Secondly, differences related to the given scaffolding and the use of rubrics are identified among the cases: in one case, systematic and contingent help is provided by the tutor and the rubrics are used to support teaching besides assessing the progress that has been achieved; in the other case, punctual, less contingent help is provided, and in the use of rubrics, the certification or account given to studentsí performance prevails.

What factors affect teacher innovative behavior: A literature review

Meta-analysis,Reflective society,Teacher professional development,Professions and applied sciences,Workplace learning

Marieke Thurlings, Eindhoven University of Technology, Netherlands; Arnoud Evers, Welten Institute, Open University of the Netherlands, Netherlands; Marjan Vermeulen, Welten Institute, Open University of the Netherlands and KPC-group, ís Hertogenbosch, Netherlands;

This literature review focuses on factors that influence teacher innovative behavior. The overarching research question was: What factors influence teacher innovative behavior? Studies were selected in a two-step procedure (i.e., first judge abstract and title, second full text) and had to meet certain criteria for inclusion and exclusion. Finally, 37 studies were selected. Findings showed that personal and organizational factors influence teacher innovative behavior. Personal factors were more closely related to innovative behavior than organizational factors. Teachers should have the ability, motivation, and opportunity in order for their innovative behavior to succeed. The overwhelming majority of studies did not test a model, nor quantitative or qualitative, with mediating or moderating factors. Therefore, for future research we recommend that studies examine the complexity of factors.

Differences in teachers' knowledge of differentiated instruction during regular and talent lessons

Case studies,Qualitative methods,Teaching/instruction,Interdisciplinary,Secondary education,Learning in context

Saskia Stollman, Leiden University, Netherlands; Jacobiene Meirink, Leiden University, Netherlands; Michiel Westenberg, Leiden University, Netherlands; Jan van Driel, Leiden University, Netherlands;

This study focuses on what happens to teachersí practical knowledge with regard to differentiated instruction when confronted with a project designed to stimulate student talent development, by comparing their practical knowledge during regular lessons with their practical knowledge during talent lessons. By making use of stimulated recall interviews (SRIs) the practical knowledge of differentiated instruction of four teachers (two male) was identified

(Meijer, Verloop, & Beijaard, 2002). All teachers but one differed in their practical knowledge about differentiated instruction during the regular and talent lessons, although the ëhowí of the difference was different for every teacher. With these results, this study provides a more detailed understanding of teachersí starting points regarding practical knowledge of differentiated instruction. Congruency between teachersí knowledge and the underlying ideas of innovation projects are important for a successful implementation of educational innovations (Verloop, Van Driel, & Meijer, 2001).

F 17

26 August 2015 15:45 - 17:15

Room Green_A4

Thematic Poster

Teacher professional development

Teacher professional development and teacher self-efficacy and higher education

Keywords: Quantitative methods,Teaching/instruction,Emotion and affect,Self-efficacy,Social sciences,Motivation and emotion,Qualitative methods,Teacher professional development,Language (Foreign and second),Secondary education,Achievement,Emotion and cognition,Interdisciplinary,Higher education,Video analysis,Pre-service teacher education,Technology,Multimedia learning,In-service teacher education,Reflection,Learning in context

Sig's: SIG 11 - Teaching and Teacher Education,SIG 14 - Learning and Professional Development,SIG 4 - Higher Education

Chairperson: Astrid M.G. Poorthuis, University of Amsterdam, Netherlands

The contribution of personality traits and emotional experience to teachers' sense of self-efficacy

Quantitative methods,Teaching/instruction,Emotion and affect,Self-efficacy,Social sciences,Motivation and emotion

Izabela Soric, University of Zadar, Croatia; Irena Buric, University of Zadar, Croatia;

ABSTRACT As Sutton and Wheatley (2003) pointed out there is surprisingly little recent research of teachersí emotional life: about the role of emotion in learning to teach, how teachersí emotional experience influence their teaching practices, how context of teaching interact with teachersí emotions, how teachers regulate their emotions etc. There are many areas in teaching profession which could be potentially affected by the teachersí personality (Ozel, 2007). Because individuals differ in their predisposition to experience certain emotions (Revelle and Scherer,

2008), it could be proposed that teachers' emotional experience would be affected by their personality traits. Also, it is possible that certain personality types may exhibit better self-efficacy. Therefore, the aim of this research was to examine the relationships between teachersí personality traits, emotions experienced at work and different aspects of their self-efficacy. In particular, we try to investigate whether teachersí personality traits and emotional experience are predictive for their sense of self-efficacy (including testing of independent contribution of these two groups of predictors). The participants were 75 primary school teachers from Zadar, Croatia. First, teachers answered questions about their gender, age and job satisfaction. After that three self-report questionnaires were applied: Teachers' sense of efficacy scale (Tschannen-Morgan and Woolfolk Hoy, 2001), Freiburg Personality Inventory (Fahrenberg, Hampel and Selg, 2008) and The Emotional Experience Scale (Soric, 2002). The series of multiple hierarchical regression analysis showed that both groups of predictors (personality traits and emotional experiences) have made significant and independent contribution to the teachersí self-efficacy.

Videoclubs: EFL teachersí professional vision before and after

Qualitative methods,Teacher professional development,Language (Foreign and second),Secondary education

Eva Minarikova, Masaryk University, Czech Republic; Misa Pisova, School of Education, Masaryk University, Czech Republic; Klara Kostkova, Charles University Prague, Czech Republic; Tomas Janik, Faculty of Education, Masaryk University, Czech Republic;

The use of video to support both pre-service and in-service teachers in developing their professional knowledge, vision and action has been given a lot of attention recently, especially in the area of mathematics and science education. However, teachers of English as a foreign language (EFL) have been neglected in this respect so far. This paper aims to fill this gap by presenting research on the use of videoclubs (cp. van Es & Sherin, 2006) to foster EFL teachersë professional vision. 11 practising EFL teachers divided into 3 groups participated in videoclubs for an academic year, analyzing video sequences mainly from their own classrooms, studying theoretical materials, and collaboratively designing activities. Data from the pre- and post-videoclub interview (teachers commenting on a video sequence from an unknown teacherís class) were analyzed in terms of: (a) what topics they address and how they elaborate on them (selective attention), and (b) what cognitive processes are evident in their comments (as indication of the knowledge-based reasoning). The analysis will shed light on the use of videoclubs to support EFL teachersë professional development as well as on the nature of their professional vision.

Beyond marks: Perceived academic control and achievement emotions influence dropout and achievement

Quantitative methods,Achievement,Emotion and cognition,Interdisciplinary,Higher education,Motivation and emotion

Lisa Respondek, Ulm University, Germany; Tina Seufert, Ulm University, Germany; Ulrike Nett, Universitat Ulm, Germany;

Academic achievement and dropout are prevalent themes in higher education literature. Besides secondary school grades, motivational and emotional factors have an impact. The Control-Value Theory of Achievement Emotions postulates especially control appraisals, such as perceived academic control, as fundamental antecedent of achievement emotions. It was also empirically approved to be a stable predictor. Additionally, the Psychological Model of College Student Retention postulates the importance of perceived academic control to reduce dropout. The aim of this study was to understand the interrelation between perceived academic control, achievement emotions, academic achievement and dropout tendency. Therefore 276 freshman student participated a questionnaire study at a German University. Additionally, the average grade point of their first academic year was obtained. The results showed perceived academic control as predictor of the unrelated achievement and dropout tendency. Similar the two emotions joy and anxiety predicted achievement and dropout tendency. Those emotions were mediator for the impact of perceived academic control and dropout tendency. These results underline the importance of perceived academic control as well as achievement emotions and confirms the model assumptions. Especially as the emotions moderate the impact of perceived academic control and dropout tendency. For a better understanding of this processes we follow up with a longitudinal study.

Transformation of subject content as improvisational semiotic practice?

Qualitative methods,Video analysis,Pre-service teacher education,Interdisciplinary,Technology,Multimedia learning

Oystein Kvinge, University of Bergen, Norway; Prof. Dr. Kari Smith, University of Bergen, Norway;

Inspired by Shulmanís notion of Pedagogical content knowledge (Shulman, 1987), this study puts teacher studentsí practice of transforming subject content using digital presentation tools under scrutiny. Semiotic technology (Zhao, Djonov, & Van Leeuwen, 2014) frequently in use in teacher education, such as Power Point, Prezi and Notebook, afford the user to transform, structure, and re-present subject content by utilizing semiotic resources made available by the software. Teacher studentsí meaning making act of presenting subject content appears to require the ability to spontaneously create cohesion among the multimodal resources of the slideshow, such as text, images and graphics, and the embodied semiotic resources of the presenter, such as speech, gaze and gesture. Scholars claim that good teaching may be likened to disciplined improvisation as it resides in the tension between structure and flexibility (Sawyer, 2011).By observing how teacher students apply semiotic technology when presenting various topics for peers, this study seeks to explore the conditions for improvisation in such settings and how improvisation may manifest itself in the multimodal interplay between technology and presenter. A multimodal social semiotic perspective is applied as theoretical (Kress, 2010) and analytical (Norris, 2004) framework.

Relational and epistemic agency: Student teachersí narrated accounts of their learning paths

Qualitative methods,In-service teacher education,Reflection,Interdisciplinary,Learning in context

Sinikka Kaartinen, University of Jyvaskyla, Finland; Kreeta Niemi, University of Jyvaskyla, Finland;

Abstract In recent years, agency has become an important aspect of humanís lives. The concept of agency emphasizes active, intentional and meaningful participation in which actor is able accomplish personal and interpersonal goals. At educational contexts, promotion of agency has been foundational to learning and wellbeing outcomes, and educational practices are advised to be organized to afford participantsí agentive participation and development of these skills and competences. In teacher education, the elaboration of studentsí conceptions of agency may have a significant effect in promoting meaningful learning experiences and encounters for children. In this study we are interested in to find out how student teachers narrate their meaningful encounters during their learning path and how this is related to the concept of agency. Drawing on sociocultural and discursive approaches, our aim is to investigate how agency emerges from the narrative data of the study. The data consist of 22 narrated accounts of student teachers and the analysis focuses on the content of the student?teachersí learning experiences. In this study, the progressive nature of the narratives was indicated by the changed voice reflecting changes in sense of agency. The relationships varied in the axis of close and distant dimensions. The sense of agency was also related to teacher: the ideal teacher was warm, encouraging, positive and safe adult and who led to meaningful learning outcomes and intentional learning practices. Key words: teacher education, agency, narrative analyses, sociocultural theory

F 18

26 August 2015 15:45 - 17:15

Room Green_A6

Thematic Poster

Workplace learning

Workplace learning

Keywords: Morality,Values education,Workplace learning,Problem-based learning,Phenomenography,Reflective society,Competencies,Professions and applied sciences,Lifelong learning,Quantitative methods,Teaching/instruction,Attitudes and beliefs,Vocational education,Mixed-method research,Content analysis,Meta-analysis,Self-regulation,Informal learning,Integrated learning

Sig's: SIG 14 - Learning and Professional Development

Chairperson: Dominik Froehlich, Maastricht University, Austria

An implementation approach on value education in organizations

Morality,Values education,Workplace learning,Problem-based learning

Sandra Niedermeier, Ludwig-Maximilians-Universitat (LMU), Germany; Heinz Mandl, Ludwig-Maximilians-Universitat (LMU), Germany;

This paper presents an implementation model for developing training measures to foster value orientation in organizations. Many organizations publish their values through value statements, ethical codes and declarations. However, the goal of value education is not simply to promote passive conformity to values, but to encourage reflective thinking and responsible behaviors of managers and employees directed by values. Discussing dilemma situations can be a powerful means to foster reflection and understanding of value oriented decision making. Accordingly, it becomes an important goal to bring value education needs assessment into an organization. To implement value education in an organization, an organization-oriented implementation process model is needed. This paper presents an implementation model on value education including two empirical studies aimed at learning value-related training needs assessment, and the further specification of training needs, followed by a workshop to identifying values particularly relevant for training and to collecting everyday authentic scenarios with specific ethical dilemma situation. In a final step these scenarios are turned into case examples with dilemma situations suited for training. Enriched with tasks for reflection, these cases can be implemented in a workplace-related training in the further education of the organization measures.

Networking and mentoring relationships as integral part of shared professional practice

Phenomenography,Reflective society,Competencies,Professions and applied sciences,Workplace learning,Lifelong learning

Eva Hornung, University of Sheffield , Ireland;

This poster will look at the role networking plays in the context of professional learning of librarians. It will report on some of the new initiatives started as a result of findings of a doctoral research study conducted in Ireland (Hornung, 2011), which investigated what conceptions one-person librarians (OPLs) held of the concept of continuing professional development. OPLs are qualified information professionals who work on their own or with only clerical support. They often find it difficult to participate in formal training events with lack of time, funding and little encouragement from management cited as the main barriers. Yet they are supposed to be up-to-date with the latest developments in their respective fields of work. This scenario formed the rationale behind the project as the researcher was keen to find out how these professionals managed their professional development. It will be this substantial piece of work that will be the main focus of the poster: how different ways of networking were key to professional practice, how mentoring played a part, and what new opportunities for networking have opened up since the study was concluded. Additionally, it will highlight international networks, which influence information professionals in Ireland and their work today.

Foster students in career decision, based on a fit of individual skills, interests and professions

Quantitative methods,Teaching/instruction,Attitudes and beliefs,Competencies,Vocational education

Manuela Keller-Schneider, Zurich University of Teacher Education, Switzerland; Stefan Albisser, Zurich University of Education, Switzerland;

The presented paper deals with supporting students in Romania with an intervention program in getting involved in their career decision. The JOBS-project (Job orientation training in businesses and schools) involves students and teachers as well as businesses as well as teacher education.. On the basis of an intervention program focusing knowledge about professions and and the awareness and the competence to assess own interests and skills students learn about professions, cooperation and individual resources to contribute and influence this decision making process. According to the design of Solomon two intervention and two control groups (one each in pre-post-design, one each only post) were inquired by questionnaires about their knowledge about professional life, their interests and their self-concept. In addition also teachers were asked to assess their motives, self-efficacy and beliefs about studentís motives, teaching and learning as well as the influence of education. The development of knowledge, skills and individual characteristics and differences between the groups will be proved with variance analyses, effects will be identified by regression analyses and interactions by a structural equation model.

The learning preferences of employees with different motivational profiles

Mixed-method research,Workplace learning,Lifelong learning

Karen Verswijvel, Universiteit Antwerpen, Belgium; Gert Vanthournout, Artemis Plantijn University College Antwerp, Belgium; David Gijbels, University of Antwerp, Belgium; Piet Van den Bossche, Universiteit Antwerpen, Belgium;

Employees expand or renew their knowledge through work-related learning, including participation in formal professional development activities. However, the outcome of formal professional development activities often remains poor because the design of these activities does not take into account the personal characteristics of participants. Therefore, this study aimed to define the link between participantsí motivation to participate (based on the self-determination theory), the nature of their goals when participating (based on the goal orientation theory) and their learning preferences (based on the Felder-Silverman model and the idea of basic needs satisfaction from the self-determination theory). A mixed-method approach was used. 805 participants from eleven organizations were questioned on their motivation using validated questionnaires. A hierarchical cluster analysis performed on the results of these questionnaires indicate that three motivational profiles can be defined: a qualitative motivational profile, a high motivational profile and a less qualitative motivational profile. Based on the resulting motivational profiles, 23 participants were selected and interviewed to explore their learning preferences. The results show that there is a general tendency in learning preferences irrespective of the motivational profile of participants. However, at some dimensions this is less pronounced for participants with a lower quality profile. This study is a first step in understanding differential effects of training-activities for participants with different motivational profiles, and therefore, this study gives inspiration to reflect on enhanced synergies between teaching and learning. Keywords: formal professional development activities,

motivational profiles, learning preferences, self-determination theory, goal orientation theory and Felder-Silverman model

Mapping and synthesizing informal self-regulated learning at work

Content analysis,Meta-analysis,Self-regulation,Informal learning,Workplace learning

Katrien Cuyvers, University of Antwerp, Belgium; Vincent Donche, University of Antwerp, Belgium; Piet Van den Bossche, University of Antwerp, Belgium;

To adjust to continuously changing work environments, employees are expected to actively identify and create learning opportunities and current debates on fostering life long learning skills in formal education further stress the need for more self-regulated learners at the workplace. Proficient informal self-regulated learning, in which employees engage in activities to set goals, monitor, regulate and control their cognition, behavior, motivation and context, can make an important contribution to the lifelong development of professionals. In the vast amount of research on self-regulated learning in multiple contexts, there is conceptual confusion on different theoretical concepts. To increase clarity on conceptual and methodological questions in the field of informal self-regulated learning in the workplace, we conducted a multi-context evidence synthesis. First results show that research in this field is scarce and foremost dominated by teacher learning research with a qualitative approach. We found that different concepts are applied to define and investigate self-regulated learning in the context of the workplace. The dynamic and cyclical nature of the self-regulated learning process is only seldom investigated. Further research is needed to complement the existing theoretical framework and improve insights on how employees informally regulate their learning at the workplace.

On conditions for transfer of learning within initial vocational education and training

Mixed-method research,Professions and applied sciences,Vocational education,Integrated learning

Nicole Furlan, University of Fribourg, Switzerland; Jean-Luc Gurtner, University of Fribourg, Switzerland;

In order to foster learnersí transfer of learning between workplace, professional schools and intercompany courses within initial vocational education and training (VET), a number of propositions have been made within the literature. Yet, lack of transfer is still acknowledged in research and the question remains, which strategies positively support transfer of learning during vocational education. Collaboration between institutions and organizations representing different learning contexts was found to be an important element for allowing transfer. Our data show, however, that limiting collaboration to an organizational level is not sufficient for promoting transfer. A mixed-method study was realized within the Leading House ìTechnologies for Vocational and Educational Trainingî in Switzerland. Results from interviews and questionnaires administered to the various stakeholders of VET in Switzerland suggest that, for transfer to happen, three levels of coordination have to be established: a. the organizational-institutional level, b. the individual level and, c. an objects-instrument level. Coordination is not only required

at the organizational-institutional level, but embraces the individual level and agency of all actors (teachers, trainers and supervisors). Moreover, boundary-crossing objects have to be introduced in the curricula, in order to help apprentices understand the permeability of the between context-borders and to integrate experiences made in one context to another context. Examples of such objects will be presented at the conference. Implications for practice and future research will be discussed.

F 19

26 August 2015 15:45 - 17:15

Room Brown_B7

Thematic Poster

Assessment methods and tools

Assessment methods and tools

Keywords: Content analysis,Qualitative methods,Assessment methods and tools,Reasoning,History,Secondary education,Quantitative methods,Teaching/instruction,Early childhood education,Primary education,Competencies,Writing/Literacy,Attitudes and beliefs,Mixed-method research,Student learning,Social aspects of learning,Motivation and emotion,Comparative studies,Meta-analysis

Sig's: SIG 1 - Assessment and Evaluation,SIG 10 - Social Interaction in Learning and Instruction,SIG 11 - Teaching and Teacher Education

Chairperson: Kari Smith, Norwegian University of Science and Technology (NTNU), Norway

Developing a progression model to formatively assess students ability in historical causal reasoning

Content analysis,Qualitative methods,Assessment methods and tools,Reasoning,History,Secondary education

Uddhava Rozendal, University of Amsterdam, Netherlands;

Abstract (248 words) Background: In many countries, historical causal reasoning, has become an important aspect of historical thinking. Most research has focused on its different components, as well as the problems students face when engaging in this ability. However, both instruments and progression models to formatively assess studentsí historical causal reasonings in the history classroom are scarce. Aim: The purpose of this study is to create and validate a progression model of students ability to construct historical causal reasonings that teachers can use for formative assessment in classroom settings. Methods: This study will be conducted in four stages. First, a literature study will be carried out to define the concept of historical causal

reasoning, and what levels of competence can be distinguished. The literature study will be complemented by an analysis of school materials that are used in history classes in various grades. Second, the findings of said study will be used to develop a preliminary progression model of historical causal reasoning. Third, in order to validate our model we will present it to an expert panel consisting of history teachers (n = 8), researchers in history education (n = 4) and exam-makers (n = 3). Finally, we will use the feedback provided by the expert panel to improve and fine tune the model. Results: Data will be gathered in winter 2014/2015. This study should result in a progression model that can be used to develop and test a series of instruments for formative assessment of students historical causal reasoning ability.

The teachersí educational practices questionnaire: A new self-evaluation instrument for teachers

Quantitative methods,Teaching/instruction,Early childhood education,Primary education

Paola Perucchini, Univeristy Roma Tre, Italy; Maria Gaetana Catalano, Roma Tre University, Italy; Giovanni Maria Vecchio, Roma Tre University, Italy;

Teachers should be able to ensure effective teaching-learning processes, but also to support a positive school climate thanks to a good classroom management. The international research on teacher professional development highlighted the importance to involve teachers into self-evaluation activities, in order to develop reflective processes and increase their professional skills. Specific self-evaluation instruments can help teachers identify issues within teaching practices and inform about any potential barriers to the achievement of an effective learning and the creation of a positive school climate. The study describes the construction of a new self-evaluation instrument named Teachersí Educational Practices Questionnaire (TEP-Q). The aims are: 1) to verify the internal and content validities of a new self-evaluation questionnaire which includes educational practices promoting the school climate; 2) to investigate in-service teachersí self-evaluation about their own educational practices, analysing differences among teachers. The review of literature on school climate and classroom management allowed to identify three dimensions of classroom management and to define a pool of items. After a small-scale administration of the first version of TEP-Q, the refined questionnaire was administered to 307 Italian in-service teachers. First results on psychometric properties were assessed and five factors related to classroom management were identified. Moreover, ANOVAs revealed significant differences among teachers, by geographic area, level of school, type of teacher and years of experience.

Comparative judgement versus rubrics: Which one is more valid, reliable and efficient?

Qualitative methods,Quantitative methods,Assessment methods and tools,Competencies,Writing/Literacy

Liesje Coertjens, University of Antwerp, Belgium; Marije Lesterhuis, University of Antwerp, Belgium; Sven De Maeyer, Antwerp University, Belgium; Vincent Donche, University of Antwerp, Belgium;

Assessing competences in a valid and reliable way is a major challenge for todayís educational institutions. A crucial aspect of performance assessment is relating some kind of appreciation (e.g. a numerical score) to a performance. The most common approach to this is analytical rating, using a scoring rubric. Assessors assign scores to a detailed list of criteria and these sub-scores are combined in an overall score. The reliability and validity of these score has however been questioned. Recently, Comparative Judgement (CJ) emerged as a promising alternative. In this method assessors only have to decide which out of two performances is best. By means of multiple pairwise comparisons, an interval-scale is generated that rank-orders studentsí work according to its quality. Although it is claimed that holistic judgment, by means of CJ, leads to more valid assessments, empirical evidence only partly supports this claim. Moreover, from a practice-oriented viewpoint, the efficiency of CJ compared to rubrics remains unclear. In order to examine and compare the validity, reliability and efficiency of these two modes of assessment, an empirical study is set up in which argumentative writing papers of 160 grade 11 students were judged.

What is gained and what is lost? National tests in Swedish compulsory school

Quantitative methods,Assessment methods and tools,Teaching/instruction,Attitudes and beliefs,Primary education,Secondary education

Asa Hirsh, Jonkoping University, Sweden;

The present study is part of a larger research project aiming at understanding how different local actors conceive of and use national tests for the forming of educational practices. It is based on a pre-study questionnaire answered by 710 teachers of grades 3, 6 and 9 in ten Swedish municipalities, and particularly concerns the teachersí experiences of how their pupils view national testing, and the ways in which pupils are prepared for the tests. Results indicate that pupils are highly affected by the perceived high stakes of the tests, and that the teachers, to a high extent, believe that pupilsí results are affected negatively by pupilsí test anxiety. This is problematized in relation to teachersí statements about what the results of national tests contribute with in terms of gaining new knowledge about student learning, and in terms of how their teaching in general is affected by test preparation. Further, the role of assessment in developing motivation for learning is discussed.

Self-determined Behaviour in the Classroom: Developing and Validating a New Observational Tool

Mixed-method research,Assessment methods and tools,Student learning,Teaching/instruction,Social aspects of learning,Motivation and emotion

Claire Kinsella, Edge Hill University, United Kingdom;

Whilst Self-determination theory research in educational settings has sometimes involved controlled experiments, field studies and interviews; questionnaires are by far the most prevalent means of assessing the extent to which individuals perceive an environment to be meeting their core human needs. However, questionnaires do not typically provide much detail on the various

learning situations which learners are reflecting upon and can be particularly demanding for younger participants, especially those with special educational needs. Therefore, it will be argued that one of the most useful ways to measure the in-depth nuances of classroom behaviours is via direct observation. In light of this, a new observational coding instrument has been developed which allows classification of in-class observations according to a series of positive and negative indicators of self-determined behaviour amongst learners and teacher support for such behaviours. This paper outlines the development, piloting and validation of this instrument which was conducted using 45-minute samples of classroom video data (N=15) and five live classroom trials. Results of the observational codings were analysed for inter-rater reliability as well as being compared with results obtained using pre-existing instruments which were designed to obtain more subjective evaluations of the classroom environment. The results of this validation process will be discussed as well as prospects for this new coding schedule to yield more precise descriptions of self-determined classroom behaviour.

Formative assessment in compulsory school: Swedish & international research in the 21 century

Comparative studies,Meta-analysis,Assessment methods and tools,Attitudes and beliefs,Social aspects of learning,Primary education

Viveca Lindberg, Karlstad University, Sweden; Asa Hirsh, Jonkoping University, Sweden;

The present paper is based a systematic research reviews (Hirsh & Lindberg, forthcoming) for the Swedish Research Council, aiming at systematically identify and report recent and current trends in research into formative assessment, in Sweden as well as internationally. Here the issue is to illuminate firstly, in what ways formative assessment is perceived and used in research contexts, and secondly what differences and similarities that exist in research on formative assessment between countries. The review is limited to research published in Swedish and peer-reviewed articles in English during 2000 - 2014. The initial searches yielded approximately 2000 hits (internationally published articles) and 230 Swedish theses and articles. However, most of the hits were related to other than compulsory school and were therefore excluded. Overall findings are that the term 'formative assessment' is used in either a narrow (instrumental) or a broad sense (a complex phenomenon addressed on various levels); that Asian studies tend to be related to ICT, while British and Australian studies have a larger width and American studies tend to be related to accountability or the No Child Left Behind-reform. In Swedish research, young researchers and classroom studies dominate. To conclude: not only theories of learning, but also basic epistemological and ontological assumptions need to be addressed in future research, as do issues related to assessment embedded in teaching, which calls for collaboration with research into classroom practices.

F 20

26 August 2015 15:45 - 17:15

Room Brown_B8

Thematic Poster

Assessment methods and tools

Assessment methods, tools and science education

Keywords: Experimental studies,Instructional design,Peer interaction,Science education,Secondary education,Inquiry learning,Mixed-method research,Teaching/instruction,Self-regulation,Higher education,Computer-supported collaborative learning,Qualitative methods,Assessment methods and tools,Reflection,Mathematics,Primary education,Communities of practice,Quantitative methods,Competencies,Psychometrics,Achievement,Language (Foreign and second),Social sciences,Cooperative/collaborative learning

Sig's: SIG 1 - Assessment and Evaluation,SIG 20 - Computer Supported Inquiry Learning

Chairperson: Anita Diaz Suarez, Pontificia Universidad Catolica de Chile, Chile

Critiquing peer ideas during technology-enhanced science inquiry learning

Experimental studies,Instructional design,Peer interaction,Science education,Secondary education,Inquiry learning

Astrid Wichmann, Ruhr University Bochum, Germany; Camillia Matuk, University of California-Berkeley, United States; Elissa Sato, University of California-Berkeley, United States; Libby Gerard, University of California-Berkeley, United States; Jacquie Madhok, University of California-Berkeley, United States; Marcia Linn, University of California-Berkeley, United States;

Generating ideas is an important part of inquiry learning. As students investigate scientific phenomena, they ask questions, test assumptions, make observations and collect evidence to generate ideas. Sharing those ideas and comparing them with peer-generated ideas allows students to reflect upon and to refine their own ideas. However, the mere sharing of ideas might not be sufficient. Based on the Knowledge Integration framework, it is important to support students in distinguishing between normative and non-normative ideas. This especially is the case when learning about abstract concepts, such as energy. In this study we explored the value of critique to support students in distinguishing between ideas about energy. In a web-based inquiry unit on photosynthesis, we scaffolded studentsí idea generation and sharing. In total, 132 students from five middle school classes were randomly assigned to one of two conditions where students either chose ideas they disagreed with (Critique) or agreed with (Agree). Open and closed response pre- and posttest items, embedded items, as well as studentsí revisions to, and the quality of, their ideas are currently being analyzed. Initial analyses of studentsí work with the Idea Manager reveal that in the Critique condition, students suggested revisions only if they deemed peer ideas to be incorrect. In the Agree condition, students tended to restate peer ideas, and to make no suggestions for revision. Findings from this study will have implications for the

role of critique and the design of technology-enhanced instruction during the generation and sharing of ideas in science inquiry learning.

Measuring use and implementation of feedback in online education: A quasi experiment study

Mixed-method research,Teaching/instruction,Peer interaction,Self-regulation,Higher education,Computer-supported collaborative learning

Anna Espasa, Universitat Oberta de Catalunya, Spain; Teresa Guasch, Open University of Catalonia (UOC), Spain; Rosa M. Mayordomo, Open University of Catalonia, Spain; Montserrat Martinez Melo, Open University of Catalonia, Spain;

The purpose of this poster is to present the application of a theoretical and methodological model to an empirical research based on a quasi-experimental study, to measure feedback use and implementation in online learning environments. For the analysis of feedback use and implementation, a review of methodological models was carried out to define a methodological approach. It includes three dimensions: participation, nature of learning and quality. This methodological model was implemented by a quasi-experimental study. Every group was randomly assigned to 1 of the experimental feedback conditions to be controlled: corrective, epistemic, suggestive, and epistemic+suggestive. The experiment consisted in elaborating a first document, receiving feedback and using and implementing feedback and delivering a final document. The whole process of discussion among students was registered taking the messages and all the documents exchanged by the group generating a text corpus. Using a mix-method approach the text corpus was transformed into a measurable data set. A first step based on qualitative perspective, consisted in observing and categorizing the documents and messages, applying content analysis. The data unit was defined as the interactivity segment in the participation process (use and implementation of the feedback) and that implies a discursive unit. Every unit was registered and categorized following the methodological model described. The second step consisted in a quantitative analysis, first describing data and then bivariable data analysis using non-parametric test. The main contribution of this study is the measure of feedback use and implementation, consolidating a methodological model to attain empirical evidence.

Conversations on assessment and mathematical knowing: How teachers use assessment to inform teaching

Qualitative methods,Assessment methods and tools,Reflection,Mathematics,Primary education,Communities of practice

Sanna Wettergren, Utbildningsforvaltningen, Stockholms stad, Sweden;

There are two points of departure for this paper. Firstly, major reforms of significant importance for teachersí assessment processes have been implemented since 2011 in Sweden, e.g. revised curriculum guidelines and a changed grading scale. These reforms are expected to guide teachersí instruction and assessment of studentsí knowing. Secondly, formative assessment has

become a major issue in Swedish schools during the past ten years. The issue of this paper is to further develop previous analyses of semi-structured, material based, and sequential focus group interviews in two compulsory schools in the Stockholm area during the period of these reforms. The analysis focuses the different aspects of formative assessment in mathematics that were only briefly mentioned in a previous version, where the tools for analysis were Fleckís concepts thought style and thought collective. Initial findings of the closer analysis show that teachers have a much richer repertoire for formative assessment than what is focused in the school debate, which seems to relate to a narrow understanding of formative assessment focusing feedback to students only. In the two groups of teachers, feedback that informs instruction instead was given attention.

Setting performance standards with the (ID) matching method

Quantitative methods,Assessment methods and tools,Competencies,Science education

Linda I. Funke, Leibniz Institute for Science and Mathematics Education (IPN), Germany; Inga Hahn, IPN Kiel, Germany; Nele Nicole Kampa, Leibniz Institute for Science and Mathematics Education (IPN), Germany; Sascha Bernholt, IPN Leibniz-Institute for Science Education, Germany;

Various methods for setting performance standards on educational tests are available. Ferrara (2014) describes a method called Item Descriptor (ID) Matching Method, which is meant to overcome the critical aspects of the most frequently used methods, named Angoff Method and Bookmark Method. Its main feature is to match knowledge and skill demands of the items to knowledge and skill descriptions of the performance levels (PLD). The (ID) Matching Method will be used to set the performance standards on the science test for adults of the National Educational Panel Study (NEPS) in Germany. In addition, 6 experts will join a three-day long meeting in March 2015. After an extensive training, the panelists match the items to the PLDs during three subsequent rounds. In each round the experts examine item by item beginning from the least difficult item to the most challenging one (Ordered Item Booklet) and match them to the PDLs. Discussions about commonalities and divergences are attached. The cut score between performance levels will be estimated and presented to the experts. After round 3 the final cut score will be set. To evaluate the process the consistency of the final cut score and documentation of the cut score adaptation process will be analyzed.

Diagnostic assessment of German as a foreign language basic vocabulary of young learners

Psychometrics,Assessment methods and tools,Achievement,Language (Foreign and second),Primary education

Tibor Vigh, University of Szeged, Hungary; Olga S. Hrebik , University of Szeged, Hungary; Tibor Vidakovich, University of Szeged, Hungary;

The aims of this research were to develop and validate test battery for the assessment of German foreign language vocabulary of students and to test these hypotheses: (1) equivalent contents and test structures result in similar student achievements; (2) the difficulty of the tasks depends on

word class, levels and frequency. Diagnostic assessment was applied to define the construct, to cover the basic German vocabulary outlined in the national curriculum and to analyse the functioning of diagnostic aspects on test, task and item level. A test battery of six tests was developed using the same structure. It consists of 576 words and all tasks contain a picture and four words. Students had to decide whether the words fitted the picture through identification or implication. The sample comprised 832 12-13-year-olds. The results show that the picture-based vocabulary test battery provides reliable information about studentsí word knowledge. Equivalent test construction and task structures resulted in empirically equivalent tests. The tests were calibrated to one common scale using the Rasch model to analyse item difficulty on the basis of studentsí ability. Significant differences were found between the average difficulty parameters on items demanding different operations. This can originate from the characteristics of the measurement instrument and from the differences by word class. The difficulty of the tasks depended also on word levels, but students do not necessarily know words better that are more frequent. The developed tests proved to be an effective tool to analyse young learnersí vocabulary.

Assessment practices in the introduction stage of the consultancy process of CL/LC Program

Mixed-method research,Assessment methods and tools,Social sciences,Cooperative/collaborative learning

Veronica Jimenez Perales, University of Vic, Spain; Mila Naranjo Llanos, University of Vic, Spain; Jose Ramon Lago Martinez, University of Vic, Spain;

The traditional conception of learning assessment has been conceived, often, as an independent process of teaching and learning process, but assessment and, more concretely, inclusive assessment has an opposite point of view and it is considerate as an inherent element of this process. This research focus on inclusive assessment in cooperative learning contexts, in schools that implement the CL/LC Program: cooperate to learning, learning to cooperate, developed by the GRAD's members (Diversity Attention Research Group) of University of Vic in the first stage of a consultancy process. Considering the methodology that propose this program, and the planning and development of didactic units with cooperative structures in different moments of unit, the hypothesis on the study are linked to a first approximation of the use of assessment along this moments of the process of teaching and learning. The research results support the hypothesis that implement the CL/LC Program in classrooms should be go according to an inclusive assessment that allow regulate and adjust the educational assistance to students.

F 21

26 August 2015 15:45 - 17:15

Room Yellow_G2

Round Table

Motivation

Peer learning and peer interaction

Keywords: Quantitative methods,Bilingual education,Achievement,Reading comprehension,Primary education,Cooperative/collaborative learning,Goal orientation,Peer interaction,Writing/Literacy,Higher education,Experimental studies,Student learning,Self-efficacy,Social interaction,Science education

Sig's: SIG 18 - Educational Effectiveness,SIG 4 - Higher Education,SIG 8 - Motivation and Emotion

Chairperson: Nathalie Aelterman, Ghent University, Belgium

Project BiPeer: Facilitating German reading in bilingual primary students through peer-learning

Quantitative methods,Bilingual education,Achievement,Reading comprehension,Primary education,Cooperative/collaborative learning

Dominique Rauch, DIPF, Germany; Jasmin Decristan, German Institute for International Educational Research (DIPF); IDeA-Research Center, Germany; Martin Schastak, German Institute of International Educational Research, Germany; Katja Richter, German Institute of International Educational Research, Germany;

The BiPeer project explores ways of supporting German reading skills in Turkish-German bilingual primary school children using peer-assisted learning strategies (PALS). These children show, from primary school onwards, lower German reading skills than their native classmates (Haag, Bohme, & Stanat, 2012).We investigate the best possible language background combination for peer-tandems, and explore the language used during the peer-to-peer-interactions. The research conducted in BiPeer equally relies on findings on successful promotion of basic school relevant competencies through peer-learning (Ginsburg-Block, Rohrbeck, & Fantuzzo, 2006) as on the theories and previous findings on language modes (Grosjean, 2001) and on academic language skills transfer (Cummins, 2000). We postulate that the reading skills training will facilitate German reading skills in bilingual children (Hypothesis 1). Regarding the language background of peers we expect German reading skills to improve more in monolingual+bilingual peer-tandems than in bilingual+bilingual tandems (Hypothesis 2), and German reading skills within bilingual+bilingual tandems to improve more when the children also use Turkish as language of peer-communication, compared to when they speak German only (Hypothesis 3). Our intervention includes 8-week PALS training with 240 primary school children in grade 3 and grade 4. The reading training groups will be compared with treatment control groups who have a PALS training in basic mathematical skills. In the round table session, results of the pilot study of 60 primary school children will be presented and discussed.

Matching students on ability: Effects on feedback quality and performance

Quantitative methods,Achievement,Goal orientation,Peer interaction,Writing/Literacy,Higher education

Bart Huisman, ICLON, Leiden University Graduate School of Teaching, Netherlands; Nadira Saab, Leiden University, Netherlands; Jan van Driel, Leiden University, Netherlands; Paul van den Broek, Leiden University, Netherlands;

Research on peer feedback has increased in the last 15 years, expanding our knowledge on the reliability and validity of peer feedback, and the structural and interpersonal variables important for design and implementation. There does not yet appear to be clear consensus on how to optimally match students, though; outcomes are somewhat mixed, and dependent on both student and contextual variables. Research in the collaborative learning literature provides some tentative indications on how to homogeneously/heterogeneously match students based on ability level. However, the extent to which this can be generalized to the peer feedback context remains unclear. This study investigates the effect of ability-matching with peer feedback on studentsí performance with written assignments. First, the relation between random ability-matches of students and subsequent performance increase was explored within an online setting (recent MOOC). Following this post hoc exploration, a quasi-experimental study is done with students attending the first-year introductory course ëPedagogical and Educational Scienceí (N=250) at a Dutch University. As a mandatory part of this course, students provide anonymous peer feedback on each otherís draft essays before summative assessment by the teaching staff. Students are randomly assigned to different matching conditions based on GPA; a homogeneous condition, or one of two heterogeneous conditions varying in size of studentsí ability discrepancy. Feedback from higher vs. lower ability students is hypothesized to be qualitatively different, with higher ability students providing more explanation and concrete suggestions for revision. Also, lower ability students are expected to mainly benefit from feedback by higher ability students.

When deliberate comparison with peers leads to optimistic and pessimistic school self-evaluation

Experimental studies,Student learning,Self-efficacy,Social interaction,Science education,Primary education

Natacha Boissicat, Universite de Nice Sophia-Antipolis, France; Therese Bouffard, Universite du Quebec a Montreal, Canada; Pascal Pansu, Universite Grenoble Alpes, France;

To evaluate their schoolwork, children often engage in comparison with classmates who slightly outperform them. Does that deliberate comparison lead pupils to feel less able or more able than they potentially are? The present study examined, among 139 pupils in their fifth year of primary school, the simultaneous impact of absolute comparison (effective comparison on the basis of their grades) and relative comparison (pupilsí perception of their standing relative to their comparison target) on self-evaluation bias in two academic domains, mathematics and language arts. We hypothesized that the relationship between absolute comparison-level choice and bias in self-evaluation would be moderated by the identification with their comparison classmate. More precisely, we predicted that when they engage in upward comparison, a high degree of identification would lead to a more positive self-evaluation bias than a low degree of

identification. Concerning relative comparison, we predicted a negative relationship with self-evaluation bias: the more they feel inferior to their comparison choice, the more negative their bias would be. Results confirmed our predictions. An absolute comparison leads pupils to benefit from an upward comparison, provided they identify themselves with their more successful classmates. Indeed, in this optimal situation, they hold optimistic self-evaluation of their competence in both school domains. However, inferiorís feeling relative to their comparison choice leads them to underestimate their academic competencies in the two concerned domains.

F 22

26 August 2015 15:45 - 17:15

Room Yellow_G3

Round Table

Assessment methods and tools

Assessment methods and tools

Keywords: Psychometrics,Quantitative methods,Assessment methods and tools,Pre-service teacher education,Teacher professional development,Technology,Case studies,Self-regulation,Primary education,Communities of practice,Mixed-method research,Mathematics,Secondary education

Sig's: SIG 1 - Assessment and Evaluation

Chairperson: Charles Max, University of Luxembourg, Luxembourg

Development of pre-service teachersí TPACK within 21st skills framework

Psychometrics,Quantitative methods,Assessment methods and tools,Pre-service teacher education,Teacher professional development,Technology

Erkko Sointu, University of Eastern Finland, Finland; Teemu Valtonen, University of Eastern Finland, Finland; Kati Makitalo-Siegl, University of Eastern Finland, Finland; Arto K. Ahonen, University of Jyvaskyla, Finland; Paivi Hakkinen, University of Jyvaskyla, Finland; Piia Naykki, University of Oulu, Finland; Sanna Jarvela, University of Oulu, Finland;

Future teachers must be able to teach 21st century skills and competencies to their students. Within 21st century skills, the role of ICT is strongly emphasized. In our project, we have used TPACK ñframework within the 21st skills framework to study more in depth the assessment and development of Finnish pre-service teachersí TPACK. Several TPACK assessment instruments exist; however, these instruments are mainly found to be very general and/or pedagogically empty. In addition, the construct of TPACK itself has been challenged during past few years. Therefore, we have begun the development process of a TPACK assessment instrument for

Finnish pre-service teachers. In the round table session, we will present the development progress of our TPACK assessment instrument including statistical analysis (e.g., factor and Rasch analysis) we have used. In addition, we will describe the cross-sectional and longitudinal research designs of our project. With our research designs and the application of multiple methods, it is possible to study and develop this new TPACK assessment instrument more thoroughly. The aims of this study are significant for both local (i.e. Finnish) and global pre-service teacher education. The collegial support and expertise that this round table session can offer is of utmost importance in order to succeed in these tasks. We expect that by sharing our experiences and ideas about measuring TPACK with other members of the round table sessions that our research efforts will be strengthened.

Nature of relations between school-based professional learning community and assessment for learning

Case studies,Assessment methods and tools,Teacher professional development,Self-regulation,Primary education,Communities of practice

Helena Kimron, Tel-Aviv University, Israel;

The purpose of this study was to examine the relations between SBPLC (School-Based Professional Learning Community) and AfL (Assessment for Learning), when they are of high quality. The findings indicated that quality SBPLC not only supports quality AfL in classroom, as was found by other researchers (Birenbaum et al., 2011; James et al., 2007). The current study indicates that the relations between these two constructs are actually mutual, when they are of a high level of quality. In other words, there is influence in the reverse direction, quality AfL in the classroom on its part, contributes to the learning of the SBPLC and its improvement. Viewing the findings through the lens of complexity theory it was concluded that SBPLC and AfL are each complex when of a high quality. Each are characterized by multi-directional interactions, by self-organization, by continually emerging "bottom-up", by de-centralization, by internal diversity, by internal redundancy and by internal co-evolution. Moreover, the mutual relations between SBPLC and AfL are conceptualized as being co-evolutional, that is, they feed into each other for mutual improvement.

Formative assessment practices in mathematics education among secondary schools in Tanzania

Mixed-method research,Assessment methods and tools,Mathematics,Secondary education

Florence Kyaruzi, Ludwig-Maximilians-Universitat (LMU), Germany; Jan-Willem Strijbos, Ludwig-Maximilians-Universitat (LMU), Germany; Stefan Ufer, Ludwig-Maximilians-Universitat (LMU), Germany;

Research on formative assessment (FA) and ìAssessment for Learningî (AfL) strongly increased over the last decade. Studies have shown that teacher perceptions of assessment, teacher self-efficacy and teachersí perceived use of feedback by students influence assessment practices. However, the majority of studies are grounded in Western education systems. Few studies have

reported accounts from for example South-American or African education systems. Moreover, comparatively few studies provide accounts of FA and AfL in mathematics. The present study investigated Tanzanian secondary school mathematics teachersí practices of FA and AfL, as well as studentsí perceptions of these assessment practices. The study will include 48 secondary schools in Tanzania (24 in the mostly urban Dar es Salaam region; 24 in the mostly rural Kilimanjaro region). Data will be collected in 48 up to 72 Form three classes (aged 16-17 years), with 48 up to 72 Form three mathematics teachers, and 1920 up to 2880 Form three students. A mixed research approach with quantitative (survey) and qualitative (interviews, focus groups) methods will be applied. Conceptions and perceptions of FA and AfL practices will be collected with previously validated (sub)scales. Interviews will be conducted will all mathematics teachers, as well as focus group discussions with a subset of students. A three level (school, class, and student) hierarchical multilevel structural equation model will be applied for analysis of the quantitive data, as students are nested within schools and and classes. Data-collection is ongoing (finalized in Dec. 2014) and findings will be presented at the conference.

F 23

26 August 2015 15:45 - 17:15

Room Green_A7

Thematic Poster

Educational policy

Educational policy and language education

Keywords: Mixed-method research,Assessment methods and tools,Metacognition,Language (Foreign and second),Secondary education,Knowledge creation,Quantitative methods,Educational policy,School effectiveness,Parental involvement in learning,Mathematics,Special education,Primary education,Attitudes and beliefs,Professions and applied sciences,Motivation and emotion

Sig's: SIG 1 - Assessment and Evaluation,SIG 10 - Social Interaction in Learning and Instruction,SIG 11 - Teaching and Teacher Education,SIG 15 - Special Educational Needs

Chairperson: Marcus Emmerich, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland

L2 oral language proficiency: Making a difference with dynamic assessment

Mixed-method research,Assessment methods and tools,Metacognition,Language (Foreign and second),Secondary education,Knowledge creation

Tziona Levi, Tel-Aviv University, ORT high school Network , Israel;

This paper derives from a study that explored how Dynamic Assessment (DA) affected students' achievements of an Oral Language Proficiency (OLP) test in English as a foreign language (EFL). The DA was administered in a large-scale test setting in Israel through both group-mediation and self-mediation attended by a teacher-tester. Among other things, the DA mediation process involved the use of a cognitive tool (SCOBA), a scoring rubric and a videotape of a pre-test. Scrutiny of the unique analysis tools of this DA mediation reveals that, in particular, application of the SCOBA can assist teachers working with DA to facilitate learning by helping their students achieve gains such as (a) knowledge about concepts underlying target assessment language, (b) how to effectively apply mediation tools, and (c) opportunities to put conceptual assessment knowledge into practice. This paper will indicate the positive influence on students' scores and will display and discuss the DA tools used.

Academic success in mathematics: The importance of parental support, and parent-school-interaction

Quantitative methods,Educational policy,School effectiveness,Parental involvement in learning,Mathematics,Secondary education

Nina A. Jude, German Institute for Int. Educational Research, Germany; Silke Hertel, Ruprecht-Karls-Universitat Heidelberg, Germany;

School and home both feature important learning opportunities for students. They provide basic resources for learning, but also advanced support to enable long-time educational success. To build a supporting relationship between schools and parents, it is important that parents need to know how to get involved with the schools, and be informed about the benefits of their engagement for their child. Latest research shows the importance of parental involvement for cognitive and non-cognitive skills. This includes school-related engagement, like talking to teachers, or volunteering in school activities, as well as parental support at home, including helping with the homework. Using the national German database for the Programme for International Student Assessment 2012, this paper analyses relationships between educational support at home, parental engagement in schools, and studentís academic success. The cross-sectional results support findings from previous studies: Parental engagement in schools depends on the parentsí socio-economic status: parents with a higher socio-economic background less often seek the teachersë advise, and rarely need to support their childís learning efforts. Parents of low-achieving children more often interact with teachers, and support their childís learning at home. Further voluntary parental engagement in school is positively correlated with the socio-economic background, but not with studentsí achievement or interest. In addition, causal relations between parental support, and change in studentsí achievement will be analysed using in a longitudinal model. Thus, the impact of parental engagement can be analysed over the period of one school year.

No inclusion without resources: An analysis of schoolsí internal use of external provided resources

Quantitative methods,Educational policy,Special education,Primary education

Jennifer Lambrecht, University of Potsdam, Germany; Stefanie Bosse, Universitat Potsdam, Germany; Christian Jaentsch, University of Potsdam, Germany; Thorsten Henke, University of Potsdam, Germany; Nadine Sporer, University of Potsdam, Germany;

Teaching children with and without special educational needs in one school causes a need of additional resources. In the multilevel government school system of Germany two main actors are involved in their distribution: Politics allocate resources to schools and school principals allocate them to teachers and students. To provide scientific knowledge on how to allocate resources to schools, it is crucial to know how those resources are allocated within a school. Following Mintzbergís Theory on Organizations (1989) we address the question, if the resources are redirected to instruction or support staff and whether this depends on the schoolís context. Our study analyzes the within-school distribution of resources using data collected in German public and privately owned primary schools. The sample of the cross-sectional survey consists of N = 76 school principals who completed an online questionnaire in the end of school-year 2013/2014 gathering data on professionalsí segmentation of working hours and the schoolís context. The collected data are analyzed using regression analysis models and cluster analyses. Preliminary empirical analyses indicate that the distribution of resources differs between schools.

Making teaching more attractive: The role of salary, working conditions, and societal expectations

Quantitative methods,Educational policy,Attitudes and beliefs,Professions and applied sciences,Secondary education,Motivation and emotion

Seong Won Han, The State University of New York at Buffalo, United States; Francesca Borgonovi, Organisation for Economic Cooperation and Development, France; Sonia Guerriero, Organisation for Economic Cooperation and Development, France;

High-school studentsí expectations for a career in the teaching profession is an important determinant in understanding how to improve teacher quality because the quality of the teaching workforce depends on who opts for a career in teaching. Top-performing countries recruit the best high-school graduates to the teaching profession, but little is known about the factors that make teaching a desirable career choice among students. This study examines the degree to which teachersí working conditions and competitive salaries are associated with studentsí expectations for the teaching profession across countries. The study draws on human capital theory that emphasizes the importance of economic incentives in explaining the development of occupational preference among students. Three-level Hierarchical Generalized Linear Models are employed to analyse data from the large-scale Program for International Student Assessment (PISA). Results revealed that competitive teacher salaries are positively associated with studentsí expectations for the teaching profession, but this positive association between competitive teacher salaries and career expectations for the teaching profession differs across different student performance levels. Teacher working conditions, such as class size and working hours, were not associated with studentsí expectations for the teaching profession. This study contributes to advancing our understanding of the ways in which policy initiatives can encourage academically strong students to consider a career in the teaching profession.

F 24

26 August 2015 15:45 - 17:15

Room Orange_E1

Round Table

Learning disabilities and special education

Learning disabilities, learning approaches and language education

Keywords: Mixed-method research,Second language acquisition,Problem solving,Language (Foreign and second),Higher education,Game-based learning,Quantitative methods,Special education,Peer interaction,Social sciences,Early childhood education,Communities of learners,Experimental studies,Student learning,Comprehension of text and graphics,Science education,Multimedia learning

Sig's: SIG 15 - Special Educational Needs,SIG 2 - Comprehension of Text and Graphics,SIG 6 - Instructional Design

Chairperson: Pirjo Aunio, University of Helsinki, Finland

Gamification in the language learning classroom

Mixed-method research,Second language acquisition,Problem solving,Language (Foreign and second),Higher education,Game-based learning

Josefina C. Santana, Universidad Panamericana, Mexico; Wade Alley, Universidad Panamericana, Mexico;

Gamification can be defined as the process of adding game elements to situations in order to increase their appeal. This paper reports on a research project currently in progress at a Mexican university. Participants are students in advanced courses of English. The course uses gamification structures to engage students in simulated real-world tasks from the business world, such as writing resumes, or creating and promoting new products. The aim of this study is to understand what role gamification can play in increasing student engagement and motivation to learn, and thus, in improving language skills. The study will involve approximately 200 students over the course of two terms (August to November, 2014, and January to May, 2015). The participants will be divided into experimental and control groups. The experimental group will follow a gamified structure in their program of studies, whilst the control group will follow a more traditional syllabus. The study is both quantitative and qualitative and uses evaluation research methods to measure: a) studentsí improvement in the use of the language; b) studentsí engagement in the activities; and c) studentsí creativity. A pilot carried out during the summer term of June-July, 2014 involved two groups of students (N=18) in the experimental group, and two groups of students (N=23) in the control group. The pilot served to tweak some of the in-

class activities, but the results were very encouraging, with participants showing both improved language skills and greater engagement in the activities.

Disabilities profile and social experiences of young children in inclusive pre-school settings

Quantitative methods,Special education,Peer interaction,Social sciences,Early childhood education,Communities of learners

Milene Gregorio Ferreira, ISPA - University Institute , Portugal; Cecilia Aguiar, ISCTE - University Institute of Lisbon, Portugal; Julia Serpa Pimentel, ISPA - University Institute, Portugal;

Friendships, positive social relationships, and a sense of belonging and membership for all children, are expectations from a recent definition of early childhood inclusion (DEC/NAEYC, 2009). This study describes the social experiences of young children with disabilities and examines the association between childrenís disability profiles and social participation indicators, such as social acceptance and rejection and characteristics of childrenís social network. Moderation effects of sex, age, and dosage will be tested, as well as the mediating role of friendship. Eighty four children with disabilities, attending preschool classrooms from the Metropolitan Area of Lisbon participated in this study. Our research on the social experiences of children with disabilities will contribute to increase available knowledge about social processes related to inclusion, identifying individual characteristics of preschool children that increases the risk of social exclusion.

Do learners who draw perform better? A comparison of different learning strategies

Experimental studies,Student learning,Comprehension of text and graphics,Science education,Higher education,Multimedia learning

Steffen Schmidgall, Leibniz-Institut fur Wissensmedien (IWM), Germany; Katharina Scheiter, Knowledge Media Research Center, Germany; Alexander Eitel, Knowledge Media Research Center, Germany;

In the present study, we investigated whether and when drawing during learning is more beneficial than other learning strategies like summarizing text, learning with multimedia or with text only. Two explanations of the drawing strategyís benefit were contrasted. According to the first explanation, there is a general benefit of the drawing strategy resulting from the need to actively construct a pictorial representation ñ in contrast to learners using multimedia and learners who summarize or only read a text, who are all less likely to show active processing regarding the construction of a pictorial representation. These benefits of drawing are assumed to occur irrespective of time of testing. According to the second explanation, the drawing strategyís benefit should unfold its whole power in a delayed test rather than in an immediate test. Because drawing requires learners to invest more effort during learning, this should impair their performance in an immediate test but lead to more stable knowledge resulting in higher performance in a delayed posttest. At this point the data of N = 120 university students has been gathered. Participants are first completing a prior knowledge test before they are instructed to

either create drawings or summaries or using multimedia or only read the text when studying a science text. After the following learning phase, participants worked on the immediate posttest. One week later, they work on the delayed posttest. Results will be presented at the conference.

F 25

26 August 2015 15:45 - 17:15

Room Purple_H2

Round Table

Mathematics education

Mathematics education and higher education

Keywords: Content analysis,Meta-analysis,Researcher education,Culture,Interdisciplinary,Higher education,Video analysis,Pre-service teacher education,Reflection,Mathematics,Model-based reasoning

Sig's: SIG 11 - Teaching and Teacher Education,SIG 4 - Higher Education

Chairperson: Aleksander Baucal, University of Belgrade, Serbia

The importance of a strong university research culture in the current global context

Content analysis,Meta-analysis,Researcher education,Culture,Interdisciplinary,Higher education

Sureetha De Silva, Griffith University, Australia;

Building a Strong Research Culture for the Enhancement of Learning Teaching and Research in Higher Education: A Review of Literature on Research Culture. As we progress towards a reflective society, advancement of research and building a strong of research culture for the enhancement of research in higher educational institutions become more important. Higher education environments worldwide are rapidly changing, due to globalization, new technologies and knowledge based economies. With increased global competitiveness and dependency upon performance measurements of academic standards in learning teaching and research, ranking higher educational institutions has become important internationally. The status of higher educational institutions is now commonly measured by rankings in league tables and strongly influenced by their research profiles. The recruitment and retention of high quality students and academic staff are increasingly determined by an institutionës position in league tables. Thus, higher educational institutions are forced to pay attention to their research profiles and their internal research cultures, which are seen as facilitating the development of learning teaching and research. This review summarizes and evaluates relevant literature and research studies on Research Culture in higher educational institutions by examining how writers worldwide conceptualise ëResearch Cultureí and what they consider to be components of a strong research

culture. The review identifies commonalities, differences, conceptualisations, and highlights what has been overlooked. It comments upon the validity and the overall quality of the available literature and points to gaps in existing knowledge. Suggestions are made regarding further possible work required.

Using the knowledge quartet as a tool for introducing the mathematics teaching practices

Video analysis,Pre-service teacher education,Reflection,Mathematics,Higher education,Model-based reasoning

Marilena Petrou, Montclair State University, United States; Nicole Panorkou, Montclair State University, United States;

In this presentation, we describe the design, implementation and retrospective analysis of a project that we are currently using with our pre-service elementary school teachers (PSTs) in one of our mathematics education courses. The project was designed having the Knowledge Quartet (Rowland et al, 2009) as a theoretical framework aiming to provide PSTs with opportunities to reflect on real classroom mathematics teaching. Our goal is to engage the audience into a discussion of how we can use this framework in teacher education for developing and deepening PSTsí mathematical knowledge for teaching and also for introducing PSTs to the implementation of the mathematics teaching practices as recommended by the National Council of Teachers of Mathematics (NCTM, 2014).

G 1

27 August 2015 08:45 - 10:15

Room Brown_B1

Invited SIG

Research methodology

Innovative methodologies in learning research

Keywords: Ethnography,Game-based learning,Learning analytics,Neuroscience,Qualitative methods,Quantitative methods

Sig's: SIG 17 - Qualitative and Quantitative Approaches to Learning and Instruction

Chairperson: Crina Damsa, University of Oslo, Norway

Organiser: Crina Damsa, University of Oslo, Norway

Organiser: Andreas Gegenfurtner, Maastricht University, Netherlands

Discussant: Filip Dochy, KU Leuven, Belgium

Research on education and learning is taking place in a society characterized by rapid change and innovation. Technological innovations in particular are strongly affecting how learning and research are organized and practiced. The learning research community is generally familiar with novel learning approaches and methodologies devised to address these emerging learning contexts and challenges. There are, however, diverging views of how such methodologies can be employed, how they contribute meaningfully to an improved understanding of learning processes in these new contexts, and how these methodologies can inform innovative educational design. This symposium aims at foregrounding four novel methodological approaches (and the supporting technologies they entail): educational neuroscience, game-based learning in designed-based research, online ethnography, and learning analytics. Despite originating in distinct sub-domains of learning research, these methodologies complement each other because they mediate the understanding of learning and related processes from various perspectives. Each contribution will present, illustrate and discuss the main features of each methodological approach; how and why the methodology in question addresses empirical problems differently than traditional methodologies; how it is being employed in empirical research; and the challenges encountered when working with these methodologies. Ultimately, the discussion in this symposium intends to highlight how these methodologies can contribute to the body of knowledge about learning research and to efforts to devise better learning activities and pedagogy.

An educational neuroscience approach to understand childrenís development of arithmetic facts

Experimental studies,Quantitative methods,Neuroscience,Mathematics

Bert De Smedt, University of Leuven, Belgium;

Educational neuroscience is a new but growing interdisciplinary research field with the core aim to conduct research that connects cognitive neuroscience and education. In this presentation, I will highlight the value added of this approach with three examples from my research on the development of childrenís arithmetic fact retrieval. First, neuroimaging data allow one to examine at the biological level how people learn. Such data can provide converging evidence for findings that have been obtained through behavioral research and this convergence of findings from different research methodologies provides a more solid ground for our theories on childrenís arithmetic fact retrieval. Second, these neuroimaging data can provide a level of analysis and measurement that that is difficult to access by behavioral studies alone. Finally, and more indirectly, neuroimaging data can be used as an input for educational research, by drawing our attention to the importance of numerical representations as a potential origin of individual differences in childrenís arithmetic fact retrieval.

Design-based research as methodology for analyzing a game-based learning course: an empirical study

Design based research,Educational technology,Pre-service teacher education,Higher education,Game-based learning

Eric Sanchez, IFE/ENS de Lyon, France;

At the ENSL, a French higher education institution, we addressed the challenge to teach students to respect the legal rules applying to the use of digital educational resources by designing an innovative, online, asynchronous and collaborative e-learning solutionñTamagocours, an online multiplayer game. Tamagocours is based on a metaphor; a Tamagotchi, which needs to be fed with digital educational resources that comply with the legal rules. We carried out an empirical study which involved 200 students. The research methodology is design-based. Researchers, instructors and computer scientists collaborated, within an iterative process, to design the game and to carry out the study. The methodology is also based on recording and analyzing the log data generated during a 60 minutes session. These digital traces enabled us for drawing behavioral and epistemic models of the students. In this presentation, I will describe how the methodology has being employed for this empirical research in terms of research design, research settings, data sources, and analysis techniques. I will also emphasize the methodological challenges that faced when investigating this online game-based learning situation. The discussion will highlight the extent to which it is possible to align innovation in research with innovation in instruction.

Bridging online ethnography and online learning environments in higher educationÖand back again

Ethnography,Teaching/instruction,Higher education,Integrated learning

Sofia Marques da Silva, University of Porto, Portugal;

Online contexts have presented a challenge to ethnography, which is typically considered an experiential form of knowledge. These challenges can be technical or methodological in nature. Research of online contexts indicates that ethnography does not necessarily entail anymore ìdirectî experience or contact. The aforementioned challenges can include the adaptation to multiple online and offline interactions; can require researchers to interact in exclusively online contexts with participants; while in other situations the researcher interacts with avatars. The results and repercussions of conducting online ethnographic studies, especially focusing on teaching experience and pedagogical reflections, are the subject of this contribution. Since 2013, I have been using Facebook Groups to work together with graduate students in the Research Methodologies course to develop small-scale group research projects. A preliminary analysis of these interactions through Facebook Groups indicates that students network collaboratively to achieve the course aims. They participate in active learning, construct meaningful knowledge, collaborate and develop higher-order thinking skills. The findings of this study provide the opportunity to discuss, in a broader perspective, how this methodology supports our understanding of teaching-learning processes, especially when it comes to how students are learning by integrating contexts and activities.

The power of learning analytics: LACE evidence hub and learning design

Learning analytics,Assessment methods and tools,Educational technology,Attitudes and beliefs,Competencies,Higher education

Bart Rienties, Open University UK, United Kingdom; Hendrik Drachsler, Open University of the Netherlands, Netherlands;

While substantial progress in learning sciences has been made, recently several big datasets and innovative learning analytics methods approaches have become available (Greller & Drachsler, 2012; Sharples et al., 2014) to unpack how learning and teaching influences attitudes, behaviour and cognition of learning at scale. At the EARLI 2015 conference, we will discuss the affordances and limitations of learning analytics, and how triangulating quantitative and qualitative data from various systems can enrich our understandings of learning. We will combine two interlinked approaches to address the potential powers of learning analytics: the LACE evidence-hub and a longitudinal study linking learning design with online behaviour, experience and cognition. Firstly, the LACE evidence hub brings together evidence from Educational Data Mining and Learning Analytics community, which are tested and validated using cloud sourcing. Second, using learning analytics techniques we compared the learning design of 87 online higher education modules, and how this impacted (static and dynamic) attitudes, VLE behaviour, and learning performance amongst 19000+ students. Our preliminary findings indicate that learning design strongly influences behaviour and cognition of students, but also that learning analytics models that worked well for one module/course may need to be adjusted for a different context.

G 2

27 August 2015 08:45 - 10:15

Room Purple_H4

Invited SIG

Teacher professional development

Moral courage in education ñ Responsibility in teaching, citizenship education and research

Keywords: Morality,Reflective society,Social sciences,Teacher professional development,Values education

Sig's: SIG 13 - Moral and Democratic Education

Chairperson: Karin Heinrichs, Goethe-Universitat Frankfurt, Germany

Organiser: Karin Heinrichs, Goethe-Universitat Frankfurt, Germany

Organiser: Dorit Alt, Kinneret College on the Sea of Galilee, Israel

Discussant: Wiel Veugelers, University of Humanistic Studies, Netherlands

This symposium brings together empirical and theoretical research on moral courage and its relation to both reflectivity and responsibility in educational research and practice. Klaassen & Maslovaty (2010, p. 3) point to three facets of moral courage: One of them lies at the centre of this symposium: it is assumed that we need people who are courageous to set examples for norms and values. Moral courage in this sense is needed to cross borders between educational research, practice and policy and support developing a reflective society. Incidents, where we need people with a creative /non-confirmative thinking who are willing to set examples for norms and values in their professional activities of learning, teaching and research, are in the focus of this symposium. Four aspects of moral courage will be discussed in this symposium: The first aspect pertains to moral courage of teachers and to the question of how teachers should fulfill the role of moral exemplars to their students.The second aspect concentrates on a widespread phenomenon of bullying and the question how educators who are involved in or observe a process of bullying, should behave. The third aspect deals with moral courage in the context of citizenship/civic political activity and the forth aspect relates to moral courage in educational research.

Teachers' authority: Relations with moral courage

Mixed-method research, Teacher professional development,Teaching/instruction,Metacognition,Morality,Interdisciplinary

Brigitte Latzko, University Leipzig, Germany;

Using an empirical approach, the paper addresses the question how teachers can build sustainable relationships with their students. First, we present our interactionist conceptualization of teachers` authority which underlines the dynamic dimension of teachers` authority. Afterwards, we present findings from an empirical study focusing on the acceptance and legitimation of pedagogical authority from the teachersí perspective and compare them with findings from studies involving studentsí conceptions of teachers` authority. Our results suggest that teacher are often not aware of the authoritative dimensions of their professional role and rather want to befriend their students. We conclude that teachersí awareness of the authoritative dimensions of their role in the student-teacher relationship ñ including taking responsibility and showing care towards their students ñ and their ability to assume and implement these dimensions reflect moral courage. Results will be further discussed with respect to their implication for educational practice in schools.

Teachers and bullying: The impact of teacherís usual reaction on studentsí bullying behavior

Teacher professional development,Teaching/instruction,Morality,Social interaction

Kristel Campaert, Universita di Firenze, Italy; Irene Pallini, Universita di Firenze, Italy; Ersilia Menesini, University of Florence, Italy; Eveline Gutzwiller-Helfenfinger, University of Teacher Education of Lucerne, Switzerland;

When not part of a specific anti-bullying intervention program, teachers react in different ways when bullying occurs in the classroom. Some intervene, though in different ways, others however do not intervene (Bauman et al., 2008; Yoon & Kerber, 2003), and have different reasons for doing so. Since bullying is a type of immoral behavior, teachers have to make a choice on what to. This dilemma can be viewed as a practical example of the role of moral courage. In this study we examined how teachersí reactions were associated to different levels of studentsí bullying. Participants were 605 students (boys=50%; Mean age=10.43; SD =1.13). We asked them to rate on a 5 point Likert scale how often their teachers react in a specific way in case of bullying. The reactions tapped were none-intervention versus intervention, mediation, group discussion and sanctions. We tested their cross-sectional association with self-reported bullying in a multivariate regression model. In this model only intervention vs. non-intervention was associated with lower levels of bullying (?=-.10; p.05). The results indicate that teachersí practiced moral courage is linked with their studentís social and moral behavior. The mere effect of teachersí standing up against bullying is more powerful than any specific type intervention. These results have potential implications for teachersí trainings on anti-bullying interventions.

Fire and Water: Political courage and political apathy as contrary elements in political education

Reflective society,Teacher professional development,Morality,Citizenship education

Fritz Oser, Universitat Freiburg, Switzerland; Horst Biedermann, University of Salzburg, Austria;

The difference between political apathy and political courage certainly is a main question in the field of civic education. Whereas political apathy includes a missing consciousness of life contexts, political courage implies knowledge and sensibilities for public problems. We show that political courage is based on (and thus related to) political interest, political self-efficacy and political trust in governmental institutions as a matter of course. But we also show that these aspects are necessary but not sufficient conditions for political courage. It seems that civic courage also depends positively from the political instability of a country ñ based on data from ICCS we will provide some empirical hints on that. In other words, the probability of showing political courage through certain forms of political activities (f.i. to criticize a governmental decision on the basis of an article in a newspaper) is higher in countries having an instable civic culture (f.i. striving against corruption) than in countries without problems of civic culture. Thus we will show that situational necessities are crucial for issues of political courage. In the paper we will firstly value aspects of civic consciousness of students between different countries, and secondly explain differences between countries based on an index of political and cultural stability.

Researchers as moral examples? Moral courage and plagiarism

Educational policy,Organization of educational research,Researcher education,Teacher professional development

Sieglinde Weyringer, University of Salzburg, Austria; Jean-Luc Patry, Universitat Salzburg, Austria; Alfred Weinberger, Padagogische Hochschule der Diozese Linz, Austria;

Plagiarism is a major problem in research and education for research, and it requires moral courage to comply with the ethical rules. Actually, it turns out that the issue of plagiarism is much more complex than usually assumed. For the analysis of moral courage three values domains are distinguished: internal (scientific), external (societal) and personal (individual) values. Moral courage consists in acting in favour of internal and/or external values at the detriment of personal ones. Moral courage is only relevant if there is a conflict (an antinomy) between personal values and internal or external values. Several types of antonomies can be distinguished. It turns out that to understand plagiarism it is important to examine the type of antinomy a person faces. Moral courage means in some situations to settle for a compromise between personal values and internal or external values. As to the studentsí plagiarism, a questionnaire study is reported which examined studentsí attitudes toward plagiarism. The results of this study are analyzed in terms of moral courage. Consequences for the discussion of moral courage both for researchers (and teachers) and for students are addressed.

G 3

27 August 2015 08:45 - 10:15

Room Brown_B2

Invited SIG

Instructional design

Instructional design models: Do they still exist?

Keywords: Cognitive skills,Educational technology,Instructional design,Student learning,Teaching/instruction

Sig's: SIG 6 - Instructional Design

Chairperson: Bjorn de Koning, VU University Amsterdam / LEARN! Institute, Netherlands

Organiser: Bjorn de Koning, VU University Amsterdam / LEARN! Institute, Netherlands

Organiser: Nikol Rummel, Ruhr University Bochum, Institute of Educational Research, Germany

Developing instructions that most effectively and/or efficiently foster learning is a primary goal of instructional designers and instructional design (ID) researchers. Comprehensive and well-grounded theoretical models are essential to provide appropriate guidance in pursuing this challenge, so it is no surprise that an ever-increasing collection of ID-models show up in the literature. This symposium aims to (re)evaluate the current state-of-affairs regarding the use,

value, and development of theoretical ID-models to advance ID research. The symposium brings together researchers who have offered influential theoretical views in the past that are still in use today, and researchers who are currently in the forefront of working on novel theoretical ID-models. In the first contribution, Jeroen van Merrienboer reflects upon the influential 4C-ID model. Next, Vincent Aleven discusses the recently developed Knowledge-Learning-Instruction (KLI) framework, which bridges across various disciplines that have accumulated knowledge about learning, but that have yet been largely unconnected. Along similar lines, the third contribution by Helmut Niegemann focusses on the Decision Oriented Instructional Design Model (DO ID) which provides a general framework for instructional design decisions. The final contribution by Manu Kapur highlights the issue of timing of instruction, which is at the core of his influential Productive Failure paradigm. Finally, the presenters and the audience engage in a discussion on the promises of present and future theoretical ID-models. This discussion is expected to result in fruitful directions for further development and refinement of theoretical models and thus to provide an impetus for conducting high-quality theoretical and educationally-relevant ID research.

25 years four-component instructional design: Still alive and kicking?

Instructional design,Student learning,Cognitive skills,Lifelong learning

Jeroen Van Merrienboer, Maastricht University, Netherlands;

Four-component instructional design (4C/ID) is an instructional design approach for complex learning, aimed at the training of complex skills and professional competencies. It provides guidelines for the analysis of real-life tasks and the transition into a training blueprint for an educational program. It is typically used for designing and developing substantial learning and/or training programs ranging in length from several weeks to several years. Its basic assumption is that blueprints for complex learning can always be described by four basic components, namely (a) learning tasks, (b) supportive information, (c) procedural information, and (d) part-task practice. Learning tasks provide the backbone of the educational program; they provide learning from varied experiences and explicitly aim at transfer of learning. The three other components are connected to this backbone. The original version of 4C/ID has been developed over 25 years ago. This presentation will reflect on how the model evolved over the past 25 years and also discusses its current and future developments, for example, in the field of game-based learning.

A decision oriented instructional design framework model (DO ID)

Educational technology,Instructional design,Teaching/instruction,Cognitive skills

Helmut M. Niegemann, Goethe-Universitat Frankfurt, Germany;

Dozens of instructional design models have been developed since about fifty years to help practitioners to design learning environments and sometimes to guide further research. The most famous framework model was the ADDIE-Model, naming five important phases of the process of instructional design (ID). The problem of ID practitioners knowing several ID models and a lot of empirical results from ID research is to decide in specific situations which model and

which results are helpful for their given task. The DO ID model defines fields of design decisions and should offer appropriate pedagogical design patterns. There is furthermore the vision to build an expert system (ìID Advisorî) based on the model; a prototype has been developed a couple of years before.

The Knowledge-Learning-Instruction (KLI) framework: Helping to bring science into practice

Instructional design,Student learning,Interdisciplinary,Science education,Technology

Vincent Aleven, Carnegie Mellon University, United States; Ken Koedinger, Carnegie Mellon University, United States; Albert T. Corbett, Carnegie Mellon University, United States; Charles Perfetti, University of Pittsburgh, United States;

Although a substantial body of research relevant to education has accumulated in cognitive science, the learning sciences, educational psychology, and learning technologies, many challenges remain in the application of research to educational practice. The Knowledge-Learning-Instruction (KLI) framework is designed to support a more systematic approach for addressing these challenges. KLI promotes instructional principles with potentially broad generality and applicability, while also focusing on the detailed analysis of the knowledge components (broadly defined) that students may acquire in courses. Drawing on research in the domains of science, math, and language learning, we present and illustrate KLIís three coordinated taxonomies of knowledge, learning, and instruction. We identify three broad classes of learning events: (a) understanding and sense-making processes, (b) induction and refinement processes, and (c) memory and fluency processes. We then illustrate how these can lead to different changes in student knowledge and constraints on optimal instructional choices. It is through these latter constraints that KLI helps tame the enormous complexity inherent in instructional design.

Learning from productive failure

Instructional design,Student learning,Cognitive skills,Mathematics,Science education

Manu Kapur, National Institute of Education, Singapore;

I advance a theoretically and empirically-grounded case for designing for and learning from failure, and instantiate it in a learning design called Productive Failure (PF). I describe the key mechanisms and the design principles of PF. The PF learning design comprises a generation and exploration phase followed by a consolidation and knowledge assembly phase. Findings show that the PF learning design is more effective in developing conceptual understanding and transfer than a direct instruction design. Follow-up studies are described wherein key aspects of the productive failure design were tested over multiple classroom-based studies as well as controlled experiments, and how these studies helped us interrogate and understand the criticality of key mechanisms embodied in the PF design. Implications for the learning theory and the design of instruction are discussed by situating findings in the long-standing instructivist-constructivist debate.

G 4

27 August 2015 08:45 - 10:15

Room Green_A1

Symposium

At-risk students

Participation in Programmes for Children and Families that Aim to Reduce Educational Disadvantages

Keywords: At-risk students,Cultural diversity in school,Early childhood education

Sig's: SIG 18 - Educational Effectiveness

Chairperson: Marianne Schuepbach, University of Bamberg, Germany

Organiser: Marianne Schuepbach, University of Bamberg, Germany

Organiser: Benjamin von Allmen, University of Bern, Switzerland

Discussant: Pamela Sammons, University of Oxford, United Kingdom

In several European countries it has been found in recent years that educational success is not independent of social and cultural backgrounds. To reduce the prevailing educational disadvantages and social inequalities, a number of services offered for parents' voluntary participation were instituted over the last few decades. In the wake of setting up and developing such service offerings, the question arises as to what families actually utilize these services, and whether the target groups are reached. This symposium will examine selective participation in these service offerings, and their impacts. The focus will be on early childhood and school-age care and education offerings for parents and children in four European countries regarding participation and (in part) impacts: We will investigate the Chancenreich early childhood intervention program offering support to parents and young children in Germany and the Sure Start Local Programmes and Sure Start Children's Centres offering services to parents of young children in England. Findings will be presented on the community schools in the Netherlands, which provide a multidiscipline network of integrated services for different educational aspects for primary school-age children. And finally, the results of a study of open-attendance all-day schools in Switzerland will be presented; these all-day schools offer education and care services for primary school-age children outside of regular school hours. The central discussion question of the symposium is whether or not the target groups participate in the service offerings in these countries.

Motivating parents to participate in parenting trainings: Evidence from the program Chancenreich

At-risk students,Parental involvement in learning,Social aspects of learning,Early childhood education

Axinja Hachfeld, Freie Universitat Berlin, Germany; Yvonne Anders , Free University Berlin, Germany; Franziska Wilke, Freie Universitat Berlin, Germany;

Previous research has highlighted the importance of a positive home learning environment (HLE) for the development of children. However, parenting trainings aiming to improve HLE often do not reach the target families. This study examines (1) whether families with different socio-economic backgrounds (i.e., economic, educational, and language backgrounds) systematically opt for different parent trainings (i.e., parent-focused vs. child-focused courses) and (2) how these two types of parent trainings are related to (a) parenting competencies and (b) childrenís socio-emotional and language development. Data comes from the study AQuaFam which has a cross-sectional design with a treatment and a control group. The treatment group includes 184 families with children aged between two and four years who have participated in a multi-module parenting project (ëChancenreichí) since birth. The control group includes 58 families with same aged children who did not participate in the project. The findings show that (1) Chancenreich successfully motivates parents from all socio-economic backgrounds to participate in parent-focused courses and (2) parent-focused courses were positively associated with improved parenting competencies (self-evaluation) and negatively with behavioral problems of the child. Child-focused courses were related to language development of the child only, and this relationship was positive. We will discuss the findings against the background of the conceptual framework of the ëChancenreichí project (free choice for parents vs. program goals) and the question of universal vs. target-group specific approaches to early childhood interventions.

Evaluation of childrenís centres in England: Delivering services through a UK family intervention

At-risk students,Parental involvement in learning,Social aspects of learning,Early childhood education

Maria Evangelou, University of Oxford, United Kingdom;

This paper will present the offer of an alternative establishment to school instruction in the UK as part of a larger symposium investigating the offer of provision for families. Childrenís centres are one of the main vehicles for ensuring that integrated and good quality family services are accessible and welcoming to all families with children aged under five in the UK. It will draw upon information collected as part of a multi-layered evaluation of provision entitled the Evaluation of Childrenís Centres in England (ECCE). This paper will describe the provision for supporting parents to enhance and encourage their childrenís early learning. It will also investigate which types of families use childrenís centre services. It will particularly consider the types of provision available to parents and young children in the most disadvantaged areas in England; centre leadership and management; multi-agency working practices; the types of families accessing the services and their needs; potential benefits of centre services for parents and children; and finally, parental views. Theoretical perspectives underlying the family

intervention will be reflected upon, along with broader educational benefits for children as a result of attending specific childrenís centre services.

Participation in and effects of community schools in the Netherlands

At-risk students,Developmental processes,Parental involvement in learning,Primary education

Joke Kruiter, Oberon, Netherlands;

In a longitudinal research including 23 Dutch community schools and 27 control group schools (with 1700 and 1800 students respectively), we studied the effects of community schools on studentsí cognitive and social-emotional development. We annually used the following research instruments: interviews with principals, teacher questionnaires about working in a community school, extended registration of participation in community school activities, cognitive tests on language and mathematics and a teacher questionnaire about studentsí social-emotional development. This research shows that, on average, there are no differences in the cognitive and social-emotional development of community school students and control group students. However, community schools do succeed in reaching students who most need additional opportunities: students with an ethnic minority background and/or a low socio-economic status participate more than other students do. And the more students participate the better their social-emotional development is.

Participation of children in all-day schools in Switzerland

At-risk students,Parental involvement in learning,Social aspects of learning,Primary education

Marianne Schuepbach, University of Bamberg, Germany; Benjamin von Allmen, University of Bern, Switzerland; Lukas Frei, University of Berne, Switzerland;

In recent years the provision of all-day schools ñ schools that in addition to regular school hours also offer education and care services (here, extended education offerings) all day long ñ has increased considerably in the German-speaking part of Switzerland. Most of the extended education offerings are fee based (income dependent) and parents can sign up their children on any days. An education policy aim is that provision of all-day schools will support children from educationally disadvantaged families with a migration background (ëchildren at riskí). A central question is then whether children at risk in fact participate in extended education offerings. There are no data available in Switzerland at present on which to base participation rates. The research project ëEduCare-TaSe ñTagesschulen und Schulerfolg?í is making it possible for the first time to analyze participation in extended education offerings. The aim is to investigate what children participate in extended education offerings and to examine whether family characteristics, such as income and migration or educational background, affect parentsí decision regarding participation. EduCare-TaSe is looking at approximately 1,800 children in the German-speaking part of Switzerland during the first two years of primary school regarding their participation in extended education offerings (53 all-day schools and 120 classrooms). About 30% of the students participate in an extended education offering. The family characteristics and participation data are being analyzed using regression and multilevel analyses. As most of the

extended education offerings are income-dependent, we can assume that children at risk are heavily represented in extended education offerings.

G 5

27 August 2015 08:45 - 10:15

Room Purple_H2

Symposium

Technology-enhanced learning

Tutoring and E-Tutoring in Educational Settings

Keywords: E-learning/ Online learning,Experimental studies,Instructional design

Sig's: SIG 6 - Instructional Design

Chairperson: Stephanie Moser, University of Salzburg, Austria

Organiser: Stephanie Moser, University of Salzburg, Austria

Organiser: Heinz Mandl, Ludwig-Maximilians-Universitat (LMU), Germany

Discussant: Joerg Zumbach, University of Salzburg, Austria

Tutoring is a helpful approach to provide support for learners in different learning situations, either face-to-face or in e-learning environments. A variety of methods can be used to shape the tutoring process. This symposium is dedicated to analyse which requirements (e-) tutors and tutorial programs must meet to effectively scaffold the learning process and, thus, facilitate learning. Within this symposium four different approaches are presented to investigate the impact of tutoring on learning. The first paper by Sonnenberg et al. presents evidence that instructional support through student's self-created metacognitive prompts promotes hypermedia learning. In the second paper Deibl et al. investigate the influence of tutor behavior in a face-to-face and an online problem-based learning setting. Outcomes show that expert-tutors lead to higher learning outcomes and a more positive evaluation of the tutor. The third paper by Nugteren et al. presents an eye-tracking study that investigates task selection on a process level, to examine where and how a tutor can aid students. Results suggest that a tutor could make a difference in correcting task selection choices, e.g., regarding students' self-assessments. Finally the contribution from Niedermeier et al. presents an approach to foster dimensions of self-determination theory by moderate constructivist designed e-tutor training programs. Empirical analyses show that this training leads to positive results regarding competence, autonomy, and (social) relatedness. To sum up, this symposium presents solid empirical research on tutorial programs and also provides conclusive implications for the design of learning environments.

Scaffolding hypermedia learning through studentís self-created metacognitive prompts

Experimental studies,Teaching/instruction,Self-regulation,Social sciences,E-learning/ Online learning,Computer-assisted learning

Christoph Sonnenberg, University of Wuerzburg, Germany; Christoph Mengelkamp, University of Wuerzburg, Germany; Johannes Loudwin, Universitat Wurzburg, Germany; Maria Bannert, Mensch-Computer-Medien, Germany;

Current research in learning and instruction demonstrates that students often have difficulties in spontaneously applying adequate regulatory activities during hypermedia learning. Therefore, the general approach of our research is to promote metacognitive skills during learning by investigating the effects of different types of metacognitive prompts. Positive effects of metacognitive prompts have been confirmed in previous studies, however several students showed a poor compliance with the provided support. Consequently, we are aiming at optimizing the effects of metacognitive prompts by involving students in the design of their own scaffolds. Two experimental studies with university students were conducted for the analysis of general effects of self-created metacognitive prompts (EG with prompts, CG without prompts) and for the comparison of this new type of support with conventional metacognitive prompts (EG1 with fixed prompts, EG2 with self-created prompts, and CG without prompts). Experiment 1 confirmed the positive effects of self-created metacognitive prompts on learning process and learning outcome. In experiment 2 learner characteristics played an important role: especially students with low verbal abilities and reading skills benefited from metacognitive support. However, we couldnít find significant differences between conventional, fixed prompts and self-created prompts. In general, this research shows the significance of metacognitive scaffolds for hypermedia learning. Further, the involvement of students in designing their own scaffolds might be a promising approach for increasing the compliance with provided support, but students need to be much more involved in prompt design. Therefore, we will investigate further kinds of self-created prompts in our future research.

The influence of tutor behavior in a face-to-face and an online problem-based-learning setting

Experimental studies,Instructional design,Problem solving,Science education,Higher education,Problem-based learning

Ines Deibl, University of Salzburg, Austria; Joerg Zumbach, University of Salzburg, Austria; Stephanie Moser, University of Salzburg, Austria;

Research on tutor characteristics in Problem-Based-Learning (PBL) is still heterogeneous. It is not quite clear to what extend a tutor needs to be an expert within the domain or not. This research analyses the influence of different tutor behavior (expert vs. moderating tutor condition) in Problem-Based-Learning. In the expert-tutoring condition, the tutor actively engaged in the learning session in order to help the students to reach the learning goals. In moderating tutoring the discussion was led without giving topic-relevant information or asking directive questions. The influence on knowledge acquisition, self-confidence, motivation, tutor rating, and evaluation

of the learning session was examined. In study 1, participants were supervised face-to-face, whereas in study 2, communication occurred via an online-chat in order to investigate if the findings of study 1 can be transferred to a computer-mediated collaboration learning environment. Differences between the different tutoring strategies in favor of an expert-tutor condition were found. In both studies, participants who were supervised by an expert-tutor gained higher scores in objective knowledge acquisition and rated their tutor more competent compared to a mere moderating-tutor.

How can tutoring support task selection?

Quantitative methods,Instructional design,Self-regulation,Computer-assisted learning

Michelle Nugteren, Open University, Netherlands; Halszka Maria Jarodzka, Open University, Netherlands; Liesbeth Kester, Utrecht University, Netherlands; Jeroen Van Merrienboer, Maastricht University, Netherlands;

Task selection could be supported by tutoring, but it is unclear which requirements a tutor must meet for this. Therefore, we investigated task selection on a process level, to help us understand where and how a tutor can aid students. An eye tracking study was set up in which participants were allowed to choose tasks freely from a database. We used eye tracking, performance estimates, estimates of mental effort and Judgments of Learning (JOLs) to gain more insight in what students focus on and think about when choosing a task. Results suggest that students need feedback on their self-assessments, and that they need to be reminded to use their self-assessments for task selection.

Do moderate constructivist e-tutor training programs foster dimensions of self-determination theory?

E-learning/ Online learning,Higher education,Motivation and emotion,Problem-based learning

Sandra Niedermeier, Ludwig-Maximilians-Universitat (LMU), Germany; Michael Sailer, Ludwig-Maximilians-Universitat (LMU), Germany; Heinz Mandl, Ludwig-Maximilians-Universitat (LMU), Germany;

The aim of this paper is to investigate, how far a moderate constructivist designed online training program can affect motivation of learners according to self-determination theory. Constructivist approaches have become a powerful driving force within the dynamic relationship between teaching methods and learning processes. However motivation often decreases during trainings. This paper presents current empirical findings on dimensions of self-determination theory of Deci and Ryan in online training programs for professional education of e-tutors under a constructivist approach. The goal of these trainings is to educate lecturers to assist learners in online courses in higher education. However it is an important goal to have motivated e-tutors after trainings. Motivated e-tutors should promote self-directed learning through sufficient monitoring and structuring activities as well as they should support cooperative learning through instruction and moderation activities at the start of group processes. To investigate the motivational impact of these trainings, motivational theories have to be under consideration,

especially self-determination theory. Self-determination theory postulates three psychological needs for competence, autonomy, and social relatedness. This study investigates effects on the psychological needs of future e-tutors. Data was collected by questionnaire from a selection of 5 trainings. Findings indicate that this particular training program format delivers positive results regarding the satisfaction of psychological needs for competence, autonomy, and (social) relatedness.

G 6

27 August 2015 08:45 - 10:15

Room Brown_B4

Symposium

Social interaction in L&I

Challenging classroom situations, teacher coercion and commitment

Keywords: Motivation and emotion,Qualitative methods,Quantitative methods,Social interaction,Teaching/instruction

Sig's: SIG 11 - Teaching and Teacher Education

Chairperson: Tim Mainhard, Utrecht University , Netherlands

Organiser: Tim Mainhard, Utrecht University , Netherlands

Discussant: Theo Wubbels, Utrecht University, Netherlands

Teachers are regularly confronted with disengaged students and disruptive student behaviour. This symposium examines teachers' responses to these challenging classroom situations in terms of teacher coercion an commitment and their effects on students. Frequently teachers choose coercion as a strategy to deal with these challenges (e.g., making fear appeals, yelling or punishments), but teachers may also view these situations as stimulating their professional intellect. In this symposium two presentations are featured that describe the effects of using coercion in class (Putwain et al. on teacher fear appeals and Mainhard et al. on differences between student and teacher perspectives). These studies suggest that overall, coercion does not enhance teachers' influence in class or positively affect students' value or expectancy of academic success. Interestingly, teacher and student characteristics seem to be important moderators of how coercion is appraised. Claessens' and van Tartwijk's study suggests that teachers frame challenging interactions as cycles of negative teacher-student interactions where disruptive or challenging student behaviour invites repressive teacher reactions (i.e. reciprocated hostility). Contra intuitive reactions seem a solution to breaking these negative interaction cycles. While Negative teacher-student interactions contribute to both coercion (Lewis et al., 2011) and decreased teacher commitment (Day et al., 2007) and negative student outcomes, the

contribution of Frelin shows that these situations have also the potential of committing teachers to their jobs if they are dealt with effectively. Theo Wubbels discusses the implications of teachers' responses to challenging classroom situations in terms of both teacher and student outcomes.

Fear appeals as coercive tactic and the value and expectancy of success

Quantitative methods,Teaching/instruction,Social interaction,Interdisciplinary,Secondary education,Motivation and emotion

Dave Putwain, Edge Hill University, United Kingdom; Wendy Symes, Ludwig-Maximilians Universitat (LMU), Germany;

A commonly used coercive tactic by teachers, prior to high-stakes examinations, is to remind students about the timing of forthcoming examinations and the consequences of failure (referred to as fear appeals). In this study we tested a cross-lagged model to examine whether fear appeals (and their appraisal) would influence studentís value and expectancy of success on their forthcoming examination and whether, in turn, value and expectancy of success influenced studentís appraisal of fear appeals. Participants were 1453 students, clustered into 57 classes, in their final two years of secondary education. They were following a programme of study leading to the high-stakes examinations taken at the end of secondary schooling (the General Certificate of Secondary Education). Self-report measures of the value and expectation of success and fear appeals (frequency of use by teacher and their appraisal as challenging or threatening) were completed over two waves. Data were analysed in a series of multilevel structural equation models. Students who valued but did not expect success reported their teacher to use more frequent fear appeals and appraised those fear appeals as more threatening. Students who valued and expected success appraised fear appeals as more challenging. Fear appeals (or their appraisal) did not influence the value and expectancy of success. Findings support a expectancy-value effects model and students differ in their appraisal of fear appeals. Teachers and instructors should be advised to avoid using fear appeals with students who value, but do not expect, success.

Teacher and student perspectives on coercion and the classroom social climate

Quantitative methods,Teaching/instruction,Social interaction,Interdisciplinary,Secondary education

Tim Mainhard, Utrecht University , Netherlands; Raisa van Winden, Utrecht University, Netherlands; Mieke Brekelmans, Utrecht University, Netherlands;

Teachers may believe that behaviours such as punishing increase their influence in class. According to students, teachers do not gain influence by using coercion, but loose warmth. We examined teachersí understanding of the effect of their coercion on the lesson social climate and tested whether teachers general interpersonal competence affects their accuracy of understanding. Teachers (N=48) and their students (N=1208) rated classroom lessons with questionnaires. Studentsí perceptions were considered the criterion for judging the teachers

understanding of the effect of their coercion. Most teachers misinterpreted coercion as helpful to gain influence and underestimated the harmfulness to their warmth during a lesson. Analyses showed that the alignment of teacher and student perceptions depended on teachersí general ability to create warm and caring classroom climates.

How teachers perceive their own and studentsí interpersonal behaviour in challenging interactions

Qualitative methods,Teaching/instruction,Social interaction,Interdisciplinary,Secondary education

Johannes van Tartwijk, Utrecht University, Netherlands; Anna van der Want, Leiden University, Netherlands; Heleen Pennings, Utrecht University, Netherlands; Perry den Brok, Eindhoven University of Technology, Netherlands; Luce Claessens, Utrecht University, Netherlands;

This study focuses on how teachersí relational scripts and schemas guide teacher behaviour when interacting with problematic students. Relational schemas (Baldwin, 1992) consist of a self-schema, an other-schema, and a script. The interpersonal script (Horowitz, 1988) represents a specific set of action patterns associated with relationship partners in a specific situation. As a language to describe teachersí scripts we use the Teacher Interpersonal Circle (Wubbels, Brekelmans, den Brok, & van Tartwijk, 2006) and complementarity, the most probable reaction an action invites (Agency or dominance invites contrasting, submissive responses and Communion or warmth invites similar, warm responses; Tracey, 2004). We analyzed scripts of 28 teachers mentioned in interviews, plotting student and teacher behavior and analyzing the context in which interaction occurred as well as the content of the talk in the interactions. The coding scheme used was of acceptable reliability (Cohenís Kappaís ranged between .73 and .89 for the four variables). Encounters in problematic relationships took mostly place in class and talk mainly involved student misbehaviour. Teachers mostly mentioned interactions rating low on Communion. We also found that it is the relationship a teacher has build with a student over time that colours teachersí perceptions of these (mis)behaviours. Our research shows that in teachersí perceptions the quality of a teacher-student relationship depend on the level of complementarity on the Communion dimension. Teachersí accounts of interactions in problematic relationships were defined by the teacherís inability to steer interactions to friendlier areas of the interpersonal model.

Challenging classroom situations: how teachers sustain their commitment to students against the odds

Qualitative methods,Teaching/instruction,Social interaction,Primary education,Secondary education

Anneli Frelin, University of Gavle, Sweden;

This paper explores sources of commitment in teachers who have maintained a high level of commitment despite challenging classroom situations. Teacher commitment is important for student success, but can be challenged by negative teacher-student relationships. Eight teachers

with a sustained level of commitment for over 15 years were selected for interviews. The semi-structured interviews were transcribed and accounts where the teachers reported on some kind of problem with student behaviour were analysed. Three main sources of commitment in challenging teacher-student relationships were indicated: reconceptualization of problems into intellectual challenges, a sense of professional responsibility for students in problems and confidence after student success against the odds. Learning from those teachers who have managed to maintain their commitment to students despite relational challenges provides important clues to sources of and conditions for commitment.

G 7

27 August 2015 08:45 - 10:15

Room Yellow_G5

Symposium

Teacher professional development

Education for the future: developing sustainable leadership in schools

Keywords: In-service teacher education,Instructional design,Qualitative methods,School effectiveness,Teacher professional development

Sig's: SIG 14 - Learning and Professional Development

Chairperson: Marco Snoek, Hogeschool van Amsterdam, Netherlands

Organiser: Marco Snoek, Hogeschool van Amsterdam, Netherlands

Organiser: Frank Bruckel, University of Teacher Education, Switzerland

Discussant: Eve Eisenschmidt, Tallinn University, Estonia

Education is widely considered as the key to address successfully common challenges with respect to society and global competition. To meet those challenges schools need to be innovative and adaptive to trends that are shaping society and education (OECD, 2013). Within schools, the teaching professions - including both teachers and school leaders - need to take leadership in these processes of innovation and adaptation (Spillane, 2006). Therefore developing leadership competences both by teachers and school leaders is an important topic in processes of lifelong learning (Murphy, 2005). The participants in this symposium share the ambition to support teachers and school leaders in developing their leadership competences so they can support innovation of the curriculum and adaptation to changing contexts. Both individually and collectively the participants offer in-service learning arrangements at Masterís level for teachers and school leaders to develop these leadership competences. Key question in the symposium is to what extent these learning arrangements are effective in developing these

leadership competences and what impact these competences have within the school. The contributions to the symposium cover several learning arrangements, both within a national context and an international collaborative context - covering the Netherlands, Switzerland and Estonia and the Principality of Liechtenstein - and the impact of these arrangements on innovations within schools at a national level. Murphy, J. (2005). Connecting teacher leadership and school improvement. Thousand Oaks: Corwin Press. OECD (2013). Trends Shaping Education 2013. Paris: OECD Spillane, J.P. (2006). Distributed Leadership. San Francisco: Jossey-Bass

Developing leadership competences within a Masterís program and its impact in schools

Case studies,Qualitative methods,Teacher professional development,Competencies,Higher education,Lifelong learning

Marco Snoek, Hogeschool van Amsterdam, Netherlands;

Learning arrangements which aim to develop the leadership of teachers and schoolleaders are based on an expected chain of outcomes: the conviction that such arrangements contribute to new competences, that these competences will be applied in the daily work within schools, that the application of these competences leads to new working practices in schools and that these new practices leads to improved pupil learning. This interconnected chain of outcomes can be considered as a transfer problem: to what extent are competences developed in a specific learning arrangement like a Masterís program, applied at the working place. This paper reports the results of two studies on a Dutch Masterís program focused on teacher leadership, and its impact on the school. In the first study the concept of transfer has been used. This study reveals important conditions in the transfer climate in schools. At the same time it shows that the concept of transfer is too static to describe the complex interconnection between masterís program, its participants and the school. In the second study the concept of boundary crossing was used. This use of this concept helped to identify important conditions in the interaction between university and school, which can help to increase the impact of a Masterís program on teacher leadership in schools.

Impact of Master's theses in schools

Qualitative methods,In-service teacher education,Conceptual change,Higher education,Lifelong learning

Bert van Veldhuizen, University of Applied Sciences / Hogeschool van Amsterdam, Netherlands; jeantine geleijnse, Hogeschool van Amsterdam, Netherlands;

Professional Masterís programs for teachers and school leaders aim to contribute to leadership practices in schools by equipping teachers and school leaders with evidence based knowledge and skills regarding teaching and learning of pupils, developing and implementing new methodologies of teaching and adapting or innovating the school organization in order to facilitate learning of pupils as well as professional development of teachers. In their final thesis the Masterís students of the Master of Pedagogy program of the University of Applied Sciences

in Amsterdam have to show that they are able to design and conduct a research which directly contributes to the development of practice in schools and contributes to the body of knowledge about practice. In most cases our students choose their research topic in collaboration with their board or headmaster. The master thesis is a proof of competence not only in doing research but also in showing analytic skills and leadership. In order to find out whether the Masterís program does influence school development a study was executed among two cohorts of alumni and their principals. The main question of this study is to identify to what extent the Masterís thesis project of students contributes to mechanisms of identification, coordination, reflection or transformation in the schools where the thesis projects are executed and to what extent the Masterís thesis project contributes to sustainable changes in practice.

The design of an international in-service program to support implementation of school improvement

Design based research,In-service teacher education,Instructional design,Conceptual change,Higher education,Lifelong learning

Klemen Slabina, Tallinn University, Estonia; Rachel Guerra Lig-Long, Department of Education, Liechtenstein;

Three universities from the Netherlands, Switzerland and Estonia and the educational authority from the Principality of Liechtenstein decided to combine their ambitions, expertise and traditions to strengthen leadership of teachers and school leaders within their countries. This resulted in a 15 credit in-service Masterís level program for teachers and school leaders with the title ëEducation for the futureí (E4F). To facilitate the professional development of educational leadership, the ambition of the E4F program is to support the participants in moving from theoretical understanding to practical application and from global (OECD) level to local (school, classroom) level, and to foster school development projects. The program should stimulate reflection (Scharmer, 2009; Hickson, 2011) and knowledge transfer (Jager, 2004). At the same time, the international context of joining different focal points should guarantee discussion and ensure that different, locally suitable solutions to challenges are implemented. From the theory on adult learning five key principles were derived which should guide the program activities: active involvement of participants, dissonance, dynamics between theory and practice, with focus on practice and duration of participantsí inclusion. With these ingredients, the challenge was to develop an effective in-service Masterís level program. This paper recognizes the design of the program as an example of an iterative process of educational design research in which several steps of predesign and redesign contributed to the final program (Van den Akker, Gravemeijer, McKenney & Nieveen, 2006).

How an international further education program supports participants in school development processes

Qualitative methods,In-service teacher education,Conceptual change,Higher education,Lifelong learning

Frank Bruckel, University of Teacher Education, Switzerland; Eniko Zala-Mezo, Zurich University of Teacher Education, Switzerland;

A collaboration between the Netherlands, Switzerland and Estonia and the Principality of Liechtenstein developed and implemented a joint Master's level program for teachers and schoolleaders with the aim to understand societal trends and to connect school development to those trends. Inspired by an analysis of these trends in different countries and by international school visits, participants should be enabled to initiate, carry out and evaluate change processes at their own schools. Therefore they are required to launch concrete projects at their schools. In a research project data on the perceptions of the participants of Switzerland and Liechtenstein regarding the impact of the program on their work in schools, were collected and analysed. The paper shows the main results and discusses possible consequences.

G 8

27 August 2015 08:45 - 10:15

Room Green_A2

Symposium

Other disciplines (philology, art, history, etc)

What makes a history teacher? The development and expertise of teachers

Keywords: History,In-service teacher education,Pre-service teacher education,Qualitative methods,Reasoning,Reflection

Sig's: SIG 11 - Teaching and Teacher Education

Chairperson: Karel Van Nieuwenhuyse, KU Leuven, Belgium

Organiser: Bjorn Wansink, Utrecht University, Netherlands

Organiser: Albert Logtenberg, Leiden University, Netherlands

Discussant: Fien Depaepe, KU Leuven, Belgium

In the international and theoretical debate on history education, agreement exists that history teaching should be aimed at engaging students in reflective historical thinking. When it comes to educational practice, however, it is still a challenge for teachers to reach this standard. From a theoretical point of view, more knowledge is needed about history teachers' professional knowledge, beliefs, their teaching experiences and how teachers reflect on and learn from these experiences. More specifically, there exist a need to determine (1) what knowledge and beliefs history teachers have, and (2) how teacher education can contribute to the development of particular knowledge and ways of reflecting on practices. Two studies discuss the role of

teachers' perspectives on history (knowledge and epistemological beliefs) and its translation to the classroom. It appears that teachers struggle with combining reflective historical thinking with a more content driven approach. The other two studies investigate the effect of assignments in teacher education on teacher learning and the development of teacher knowledge. The focus of these studies is on teacher reflection on teaching history and student's historical reasoning. Each study offers domain-specific and empirically supported claims about important characteristics of developing history teachers.

From historical facts to interpretation? The certainty paradox of prospective history teachers

Qualitative methods,In-service teacher education,Attitudes and beliefs,History,Higher education

Bjorn Wansink, Utrecht University, Netherlands; Sanne Akkerman, Utrecht University, Netherlands; Theo Wubbels, Utrecht University, Netherlands;

This paper focuses on the questions how prospective history teachers epistemologically represent history and what factors constrain or stimulate teaching historical facts and interpretational history. Using a line drawing technique, the views of their first year of teaching were investigated, by examining how they picture their development in relation to teaching historical facts and interpretational history. The results show that most teachers start teaching history with a focus upon teaching historical facts, and that during their apprenticeship they gain confidence and learn to teach interpretational history. Several factors influence this development. First expertise development on three distinct areas: classroom management expertise, pedagogical expertise and subject-matter expertise. It appeared that teachers first need to feel confident about their expertise before they start teaching interpretational history. We have termed this the certainty paradox. Factors such as school culture, pupils, teacher education and artefacts can constrain or stimulate teaching interpretational history. It proved that teacher education mostly stimulates teaching interpretational history, and that mediating artefacts, such as the tests and the history book constrains interpretational history teaching. School culture and pupils provided stimuli that can stimulate and can constrain interpretational history teaching.

How learning journals promote history teacher studentsí knowledge integration

Experimental studies,Pre-service teacher education,Cognitive skills,Reflection,History,Higher education

Kristin Waeschle, University of Freiburg, Germany; Nicola Brauch, University of Freiburg, Germany; Thomas Lehmann, university bremen, Germany; Matthias Nuckles, University of Freiburg, Germany;

Becoming a history teacher requires the integration of pedagogical knowledge, pedagogical content knowledge, and content knowledge. As the integration of knowledge from different disciplines is a complex, demanding task, we investigated the effects of prompted learning journals on teacher studentsí knowledge integration. Fifty-two pre-service history teacher students participated in the experimental study. They read a text about learning processes, a text

about a historical event, and a text about teaching history and wrote a learning journal about the three texts. While participants in the control condition chose their strategies spontaneously, students in the integration prompt condition received integration prompts. The integration prompts primarily caused an increase in integration strategies and a decrease in paraphrasing in the prompted journal writing condition. Furthermore, the results showed that students in the integration prompt condition used the information from the different texts in a more balanced way and considered learning processes and the learnersí needs when designing a learning task more often than the students in the unprompted condition. The study illustrates the potentials of prompted journal writing as a tool to support knowledge integration in history teacher education.

History teachersí beliefs about inquiry learning: Learning goals, inquiry orientations, and teaching

Qualitative methods,Teaching/instruction,History,Secondary education,Inquiry learning

Michiel Voet, Ghent University, Belgium; Bram De Wever, Ghent University, Belgium;

Research on history education has repeatedly called for the integration of inquiry-based learning activities into the classroom, as this can increase studentsí understanding of the way in which the past is constructed by historians, as well as the content of history. Earlier research indicates that teachersí behaviour is heavily influenced by their subject beliefs, although the context in which they teach ultimately determines how beliefs are transformed into practice. Unfortunately, knowledge about history teachersí beliefs about inquiry learning is still limited. As such, the aim of the present study is to examine history teachersí beliefs about inquiry learning, in relation to more general beliefs about teaching and the context in which they teach history. Interviews were conducted with 22 teachers, who taught history in the fourth grade of secondary school (average student age: 16) in Flanders (Belgium). Findings indicate that, although inquiry-based learning activities appear to seep through to the classroom, the main focus of teaching still lies on teaching content rather than procedural knowledge, and most teachers are only considering a limited integration of inquiry-based learning activities.

Learning to teach history. What do beginning teachers learn from their studentsí questioning?

Action research,In-service teacher education,Reflection,History,Higher education,Problem-based learning

Albert Logtenberg, Leiden University, Netherlands;

This research investigates the learning of History student-teachers during their teaching practicum in secondary education. Beginning history teachers have difficulties in combining different goals, beliefs and attitudes regarding the teaching of history and therefore need tasks that prepare them for teaching historical reasoning in their classrooms. The aim of this study is to evaluate such an assignment in a teacher education course about teaching and learning history. Teachers were instructed to design and perform a history lesson introduction that triggered students to pose historical questions. Lesson plans, video-recordings, lesson reflections and

interviews of seven teachers were analysed. Some student- teachers succeeded in facilitating student questioning and reflected on the historical questions of their students, whereas other student-teachers did not trigger many student questions and mostly reflected on their own classroom organisation. For student-teachers, the student questioning approach seems to be a meaningful but complicated assignment to support the learning process of their students.

G 9

27 August 2015 08:45 - 10:15

Room Green_A4

Symposium

Comprehension of text and graphics

Mental Picture-Text-Integration: Process Analysis, Supporting Strategies, and Picture-Text Design

Keywords: Comprehension of text and graphics,Design based research,Instructional design

Sig's: SIG 2 - Comprehension of Text and Graphics

Chairperson: Tina Seufert, Ulm University, Germany

Organiser: Ulrike Magner, Ulm University, Germany

Organiser: Tina Seufert, Ulm University, Germany

Discussant: Neil Schwartz, California State University, United States

Multimedia learning is a highly focused topic in educational research with lots of studies on learning with text and pictures. However, little is known about the function of pictures and related supporting strategies during the picture-text-integration process. In this symposium, all studies address the picture-text-integration process. We shed light on the following two questions: Does picture-text-integration take place during learning or during reproduction? And how can we support this integration process? (1)Two studies concentrate on the integration of a coherent mental modal: One study showed with eye-tracking that integration of picture and text takes place during learning. The other study showed that integration of pictures into mental model depends on the surface structure of the picture, especially for meaningful learning processes such as understanding. Both studies used text-related pictures. (2)Two studies used different supporting strategies to help learners integrating information from picture and text. One study showed that learners can be supported by the combination of presenting pictures and an additional eye movement modeling example. Eye-tracking data revealed a mediation effect of integrative picture-text processing on learning outcomes for recall, factual knowledge and transfer. The other study showed that novice learners benefitted from prompts but not from

behavioral activity. However, for leaners with sufficient prior knowledge the behavioral activity seems to be beneficial. The proposals cover also methodical issues: Both, online measurement (eye-tracking) as well as offline measurement (learning outcomes) was used. Furthermore, both students at school as well as university students participated.

Investigating text-picture integration during processing multimedia materials

Design based research,Instructional design,Comprehension of text and graphics,Multimedia learning

Anne Schueler, Knowledge Media Research Center, Germany; Katharina Scheiter, Knowledge Media Research Center, Germany;

A paradigm from text comprehension research was adapted to multimedia learning conditions to test whether text-picture integration occurs already during processing the materials. In the learning phase, subjects were presented with information about a tourist center and a holiday farm. In the control group, all information conveyed through text and pictures was consistent. In the experimental group, two out of 24 slides contained inconsistent information, that is, the text differed from the visualized content. During learning, eye-movement behavior of learners was measured. Analyses revealed that the eye-movement behavior of the control and experimental group did not differ regarding slides containing consistent information in both conditions. However, both groups differed regarding slides containing consistent information in the control, but inconsistent information in the experimental group: Here, learners of the experimental group spent more time on slides, had longer fixation times on text and picture, and had more revisits to text and picture. These data indicate that text-picture integration already occurs during processing multimedia materials.

The surface-structure effect: The fit between picture and text matters

Design based research,Instructional design,Comprehension of text and graphics,Multimedia learning

Ulrike Magner, Ulm University, Germany; Shabnam Ghezelbash, Ulm University, Germany; Tina Seufert, Ulm University, Germany;

Do all text-related pictures support the construction of mental representations? Or is this supporting function depending of the surface structure of pictures and the level of learning process? To answer these questions, we conducted a study with two experimental conditions: one condition with text-related pictures whose surface structure fit to the text (text-appropriate) and another condition with text-related pictures whose surface structure did not fit to the text (test-inappropriate). Learning outcomes were assessed as surface learning (reproduction of knowledge) and deep-level learning (understanding). We randomly assigned 28 students to one of the two conditions. Our results showed that learners in the condition with appropriate pictures had higher learning outcomes for deep-level learning than learners in the other condition. The learning outcomes for surface learning did not differ significantly. Furthermore, learners in text-inappropriate picture condition reported a higher extraneous load than the learners in the other

condition. Therefore, we conclude that text-related picture should show an appropriate surface structure referring to the text content especially for deep-level learning. Ratings of extraneous load support this conclusion.

Using eye movements to model the sequence of text-picture processing in multimedia learning

Design based research,Instructional design,Comprehension of text and graphics,Multimedia learning

Lucia Mason, University of Padova, Italy; Maria Caterina Tornatora, University of Padova, Italy; Katharina Scheiter, Knowledge Media Research Center, Germany;

This study used eye movement modeling examples (EMME) in the school context to model studentsí integrative processing of verbal and graphical information. In particular, it examined the effects of the temporal sequence of text and picture processing as shown in various replays of a modelís gazes while reading an illustrated text on a topic different from that of the learning text. Eighty-four 7th graders were randomly assigned to four conditions: text-first EMME, picture-first EMME, picture-last EMME, and No-EMME. During the learning episode, all students in the EMME and No-EMME conditions read the same illustrated text on season change. On-line measures of text processing and off-line measures of retention, learning, and transfer were used. Eye-movement indices indicate that only readers in the picture-first EMME condition spent longer processing the picture and showed stronger integrative processing than students in the No-EMME condition, as revealed by the frequency of gaze shifts (transitions from text to picture and from picture to text) and the time spent re-inspecting the picture while re-reading the text and re-reading the text while re-inspecting the picture (look-from text to picture and from picture to text fixation time). For retention readers of all EMME conditions outperformed those in the control condition. However, for learning and transfer of factual knowledge, only the readers in the picture-first EMME condition were significantly superior to the readers in the No-EMME condition. The duration of integrative processing mediated the effect of condition on all post-reading outcomes.

How to engage learners in active text-picture integration: No behavioral activity for novices

Design based research,Mixed-method research,Instructional design,Comprehension of text and graphics,Multimedia learning

Irene Skuballa, University of Tuebingen, Germany; Jasmin Leber, University of Freiburg, Germany; Christoph Ries, University of Freiburg, Germany; Seitz-Ndiaye Johanna, University of Freiburg, Germany; Alexander Renkl, University of Freiburg, Germany;

Instructional interventions which elicit high cognitive engagement foster meaningful multimedia learning in novice learners. However, according to Mayer (2009), meaningful learning can be also achieved by instructional interventions which augment high cognitive engagement by additional behavioral engagement. We examined both stances and raised the question in how far cognitive engagement versus cognitive engagement plus behavioural engagement are beneficial

for learners. In addition, we investigated the role of prior knowledge. To test our questions we developed prompts asking learners to mentally integrate text and picture information (think group) or to additionally highlight this information (highlight group) in a multimedia learning environment. In Study I (N = 65) learners were novice; in Study II (N = 64) we varied prior knowledge by a domain-specific pretraining. Results of Study I show that novices profit from instructions which aim at cognitive engagement; adding behavioral activity, however, is detrimental for meaningful multimedia learning. Results of Study II show that prior knowledge moderates the relationship between condition and learning outcomes. Asking learners to engage in behavioral activity by highlighting can be beneficial when learners have some prior knowledge. We can conclude that the aforementioned framework must be reconsidered and both stances are not equally good. The effectiveness of cognitive and behavioral engagement in text-picture integration depends on learnersí prior knowledge.

G 10

27 August 2015 08:45 - 10:15

Room Brown_B5

Symposium

Assessment methods and tools

Entrustment and Learning Analytics in E-portfolios for Workplace Learning and Assessment

Keywords: Assessment methods and tools,Competencies,Design based research,Learning analytics,Workplace learning

Sig's: SIG 1 - Assessment and Evaluation

Chairperson: Marieke van der Schaaf, Utrecht University, Netherlands

Organiser: Marieke van der Schaaf, Utrecht University, Netherlands

Discussant: David Boud, University of Technology, Sydney, Australia

During workplace based learning supervisors continuously have to decide: (1) when to trust learners with critical professional activities and (2) how to provide them with feedback and assessment. E-portfolios (EPs) and Learning Analytics (LA) may serve to improve this. However, up till now EPs are often not well tailored to the workplace or low in quality. The aim of this symposium is to provide insight in how workplace-based feedback and assessment with EPs can be improved. Innovative theories about expertise development will be synergized with the development of a LA system. This symposium presents a European cooperation project, called WATCHME, linking learners, teachers, and researchers. First Peters presents a Delphi study that resulted in crucial Entrustable Professional Activities as a framework for learning in

undergraduate medical education. Then Leijen et al. describe the development of performance-based competency requirements for student teachers. Next Van der Schaaf et al. focus on an approach to improve the quality of workplace-based feedback and assessment through enhancing EPs with LA. To conclude, Schreurs et al. specify this approach by using focus groups in a participatory design of LA enhancement to EPs. This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 619349.

Entrustable professional activities for learning in competency-based undergraduate medical education

Design based research,Assessment methods and tools,Competencies,Workplace learning

Harm Peters, Charite-Universitatsmedizin Berlin, Germany;

Entrustable Professional Activities (EPAs) are increasingly employed in postgraduate, competency-based medical education and training. EPAs provide a framework that allows to drive teaching and learning, and to assess the progress of medical traineesí levels of competency in a holistic manner. As physicians have to pass through various stages of training in order to become independently practising specialists, specific professional activities and their supervision level can be identified for each of these stages in order to structure and ensure continuous medical education. The Charite - Universitatsmedizin Berlin is defining core EPAs to structure and synthesize its competency-based undergraduate medical education program. A three-round Delphi study was conducted among 36 physicians of various medical specialties in order to identify and define those core EPAs which residents should be able to carry out on their first days in clinic without direct supervision. The research question was: What EPAs are needed in undergraduate medical training? Results showed high consensus for six of the 12 formulated EPAs (CVI > 80%). The resulting core EPAs serve as integrated, end of training outcomes for the undergraduate medical curriculum and provide the basis for development of an Electronic portfolio system and the application of Learning Analytics. Based on the first Delphi-round, the Charite undergraduate EPAs show reasonable overlap with recently reported undergraduate EPAs from the Association of American Medical Colleges. In conclusion, employing EPAs to structure competency-based, undergraduate curricula allows a meaningful synthesis of studentsí teaching and learning with the assessment of knowledge, skills and attitude acquisition.

Performance-based competency requirements for student teachers and how to assess them

Design based research,Assessment methods and tools,Competencies,Workplace learning

Ali Leijen, University of Tartu, Estonia; Bert Slof, Utrecht University, Netherlands; Edgar Krull, University of Tartu, Estonia; Liina Malva, Tartu University, Estonia; Pihel Hunt, University of Tartu, Estonia; Johannes van Tartwijk, Utrecht University, Netherlands; Marieke van der Schaaf, Utrecht University, Netherlands;

This paper explores a possibility for enhancing workplace-based learning with E-portfolios in initial teacher education. Several innovative concepts (i.e., core practice, Entrustable

Professional Activities and rubric assessment) were utilized to develop a new framework to assess and foster the development of student teachersí performance-based competency requirements. An explorative study was conducted to develop and validate the crucial professional activities for student teachers and their assessment rubrics. In Step one a list of professional activities was presented to the four teacher educators and the head of the teacher educator institute in Estonia and The Netherlands. Three revision rounds were held to develop a final list with professional activities student teachers should master during their internship placement. In Step two, a rubric containing four performance level descriptions for each activity was composed. Again, three revision rounds were held to develop the final rubric. Preliminary findings from Step one indicate that 11 professional activities (e.g., supervises the execution of learning activities and directs the communication processes in the group) are crucial to be mastered during the internship placement. Preliminary findings from Step two indicate that participants in The Netherlands were also able to define the performance levels, cut score and required evidence. Step two of the Delphi approach is still in progress in Estonia. Although these results seem promising, they provide no insight into how the assessment rubric is used during workplace-based learning. To this end, a next step in the validation process is to study the effects its implementation.

Enhancing electronic portfolios for workplace-based assessment by learning analytics

Learning analytics,Assessment methods and tools,Competencies,Workplace learning

Marieke van der Schaaf, Utrecht University, Netherlands; Bert Slof, Utrecht University, Netherlands; Atta Badii, University of Reading, United Kingdom; Ovidiu Serban, University of Reading, United Kingdom; Jeroen Donkers, Maastricht University, Netherlands;

In the complex professional world there is an urgent need for solutions to restore and guarantee the quality of assessment and feedback for professionals. Continuing education at the workplace has seen the use of Electronic portfolios (EPs) as a crucial means for acquiring the requisite professional knowledge and skills. Although EPs provide a useful approach to view each traineeís progress, so far they offer no dynamic feedback to exploit the rich contextual learning assessment data that could be analysed to support responsive adaptation for more efficient and rewarding training. This theoretical paper advocates that EPs enhanced with a Learning Analytics (LA) engine, might increase the quality and efficiency of workplace-based feedback and assessment. This paper outlines an iterative LA design approach that is applied in a European 7th framework project, called WATCHME (www.project-watchme.eu). The approach is driven by an interaction of machine processing (statistical models) and human reasoning (theory about expertise development) and consists of five phases. First, information about crucial professional activities for the selected profession will be collected (phase 1). Thereafter, suited assessment instruments and technical requirements (phase 2) and student models will be defined (phase 3). Next, tools and devices for providing just-in-time feedback and visualisations will be developed (phase 4). Last, formative and summative evaluation cycles take place and the results are fed back to the other phases (phase 5). It is concluded that this design approach will only succeed when developed and implemented through the eyes of the users.

Participatory design of a learning analytics enhancement to e-portfolios: The human factor

Learning analytics,Assessment methods and tools,Competencies,Workplace learning

Eelco Schreurs, University of Maastricht, Netherlands; Atta Badii, University of Reading, United Kingdom; Annemarie Camp, Maastricht University, Netherlands; Inge Duimel, Maastricht University, Netherlands; Ovidiu Serban, University of Reading, United Kingdom; Daniel Thiemert, University of Reading, United Kingdom; Jaime Costa, University of Reading, United Kingdom; Marieke van der Schaaf, Utrecht University, Netherlands; Jeroen Donkers, Maastricht University, Netherlands;

Learning at the workplace is supported by a rich collection of assessment instruments that provide continuous, longitudinal and multi-facetted information on the development of the learner. The results of these assessments can be collected and structured in an E-portfolio (EP), but users often complain about the amount of presented data and the complexity of navigating through this data. This hinders fast access to relevant information. Learning Analytics (LA) can offer a solution to this problem. In our approach, techniques from machine learning and data mining will be applied on portfolio data to construct probabilistic student models that will be able to generate the required just-in-time feedback messages, within three workplace-based learning domains: anaesthesiology, veterinary medicine, and teacher education. In this contribution we aimed to study the human factor in the design. The research question was: What are the objectives of stakeholders with regard to LA enhanced EP assessment in the three domains and how do they differ? A series of three focus groups was organized involving different stakeholders and domains. Preliminary results on the basis of the first focus groups were that there are large differences between workplace assessment procedures among the targeted domains and that there are large difference between the needs of learners and their supervisors. Finally, supervisors in anaesthesiology were mostly interested in identifying students with insufficient progress whereas other supervisors indicated foremost interest in general development.

G 11

27 August 2015 08:45 - 10:15

Room Purple_H3 (Rialto)

Symposium

Cognitive development

CONTEXTUAL FACTORS IN USING AND UNDERSTANDING EVIDENCE

Keywords: Argumentation,Attitudes and beliefs,Cognitive development

Sig's: SIG 26 - Argumentation, Dialogue and Reasoning

Chairperson: Clark Chinn, Rutgers University, United States

Organiser: Kalypso Iordanou, University of Central Lancashire, Cyprus

Discussant: Baruch Schwarz, Hebrew University, Israel

Evidence is central to reasoning (Kuhn et al., 2013) and individuals' appreciation of evidence in a particular context has been proposed to be related with the learning processes that individuals engage in and the conclusions they draw (Chinn, Buckland and Samarapungavan, 2011). This symposium aims to shed light on how contextual factors affect the use, appreciation and interpretation of evidence and conflicting knowledge claims. In particular, Paus and Macagno will present a study that compared students' use of evidence in a solitary condition with a dialogic condition. In the second paper, Khait and Kuhn will present findings from a longitudinal study employing the argument curriculum and discuss the challenges students encounter and the progress they make in recognizing that evidence may be as relevant to an opponent's position as it is to one's own position. Third, Iordanou will present a study that examined engagement in argumentation as a means for promoting appreciation of evidence in knowledge construction and compare the challenges in developing appreciation of evidence in different domains. Finally, Barzilai, Thomm and Bromme will present a study that examined the different challenges posed by diverse disciplinary contexts in making sense of controversial knowledge claims. As a discussant, Baruch Schwarz will add commentary to highlight implications and Clark Chinn, as a Chair will coordinate a discussion regarding the theoretical and educational implications of the contributions.

Better two than one? How dialogic interaction influences adolescentsí evidence use in argumentation

Conversation/ Discourse analysis,Student learning,Argumentation,Reasoning,Higher education

Elisabeth Mayweg-Paus, University of Muenster, Germany; Fabrizio Macagno, New University of Lisbon, Portugal; Maria Zimmermann, University of Munster, Germany;

In a 1x2 cross-over study design 37 adolescent students were either asked to discuss the topic of ìBanning cigarettes sales in the U.S.î with their partner first and to subsequently write an individual essay supporting their opinion or vice versa. As background information they were provided a set of 15 pieces of evidence of varying quality. Dialogs and essays were analysed regarding 1) the kind of evidence used and 2) the way evidence was used. In the essays students referred more often to the evidence from the set provided. In contrast, in dialogs students used evidence more often to address the opposing viewpoint by incorporating it in a more elaborated (more critical and clearer) line of reasoning. The findings suggest dialogs to be a more effective pedagogical tool than individual production and are suggestive regarding the development of curricula to support students in developing effective use of evidence in argumentation.

Coordinating claims and evidence in argumentation

Argumentation,Cognitive development,Reasoning,Social interaction

Valerie Khait, Columbia University, United States; Deanna Kuhn, Columbia University, United States;

Students at an early stage of developing skills in dialogic argumentation share a characteristic with students who are novices in writing individual argumentive essays. Both largely neglect the opposing position. The writer has full command and is at liberty to ignore the opposing position while elaborating in great detail the many strengths of the writerís own position. It is a little more challenging in the dialogic context, but one may, and we have found often does, ignore the interlocutorís contributions to the exchange, waiting patiently until the other has finished speaking so as to be able to return to the theme of oneís own position and its virtues. With extended practice, students do surmount the severe constraint that unilateral argumentation represents and begin to acknowledge and attend to an opposing position. What we have found of interest and focus on in this presentation is the parallel developmental course that students must navigate when we introduce evidence that they then begin to integrate into their arguments. Here qualitative and quantitative evidence indicates that students exhibit a parallel difficulty in recognizing that evidence may be as relevant to an opponentís position as it is to oneís own position. In this presentation, we examine the challenges students encounter and the progress they make in meeting them.

Supporting appreciation of evidence through argumentation in the social and science domains

Argumentation,Attitudes and beliefs,Cognitive development,Metacognition,Reasoning

Kalypso Iordanou, University of Central Lancashire, Cyprus;

The present work examines whether engagement in argumentation supports the development of studentsí appreciation of evidence and constructivist views of knowledge, in the social and science domains. The research design is a straightforward one in which students were randomly assigned to one of two intervention conditions ñ social content or science content ñ and engaged in a series of argumentive activities. Participantsí epistemological understanding and views about their own and scientistsí process of knowing were assessed. Results showed that engagement in dialogic argumentive activities supported the development of more constructivist domain-specific epistemological understanding. Domain differences in how participants valued evidence highlighted the different challenges in developing appreciation of evidence in different domains.

How can researchers arrive at such different conclusions? Understanding conflicts across disciplines

Mixed-method research,Metacognition,Reasoning,Learning in context

Sarit Barzilai, University of Haifa, Israel; Eva Thomm, University of Munster, Germany; Rainer Bromme, Universitat Munster, Germany;

Laypeople who wish to comprehend complex issues are often faced with conflicting expert accounts. To reconcile contradictions between experts, people need to understand how and why

researchers might reach divergent conclusions regarding the same topic. This contribution examined the role of disciplinary contexts of conflicts and focused on differences in studentsí explanations for conflicts between biologists and between historians. The study employed a convergent mixed-methods approach. 177 students responded to a paper-and-pencil conflict explanations assessment regarding controversies in biology and history. 30 students were interviewed and provided detailed conflict explanations that were used to interpret and extend the quantitative results. Quantitative and qualitative data indicated that in biology, conflicts were predominantly attributed to thematic complexity and differences in research practices, whereas in history, conflicts were primarily attributed to thematic complexity, researchersí backgrounds, and motivations, with research practices playing a secondary role. The interviews revealed that students considered specific disciplinary research practices and employed this knowledge in order to interpret differences between researchersí conclusions in discipline appropriate ways. Yet appreciation of the impact of research practices was more elaborate in the biology problem, whereas in the history problem the subjective perspective of the researcher was the focus of attention. The present study highlights the importance of lay appreciation of expert research practices for making sense of controversial knowledge claims and the different challenges posed by diverse disciplinary contexts.

G 12

27 August 2015 08:45 - 10:15

Room Brown_B3

Symposium

Teacher professional development

Leading Professional Development for STEM-Teachers

Keywords: Communities of learners,Cooperative/collaborative learning,Mathematics,Science education,Teacher professional development

Sig's: SIG 11 - Teaching and Teacher Education

Chairperson: Hilda Borko, Stanford University, United States

Organiser: Alexander Groeschner, Technische Universitat Munchen (TUM), Germany

Organiser: Hilda Borko, Stanford University, United States

Discussant: Nanette Seago, WestEd, United States

Aims. Research has shown that ongoing, long-term professional development programs that actively engage teachers in a professional learning community can result in improvements in teaching and student achievement. Effective facilitation is key to the success of such programs.

Thus, the role of teacher leaders, teacher educators or other experts who provide professional learning opportunities is pivotal. However, research on facilitators and facilitation moves, is limited. We have much to learn about how to design and facilitate productive learning experiences for teachers. This symposium contributes to this knowledge base by sharing findings on the role of the facilitator in four successful PD programs. Each study is one component of the program's research agenda. Paper one focuses on the facilitator's role in building a teacher learning community and fostering trustful exchanges among group members in the Dialogic Video Cycle PD program. Paper two compares the practices of university- and school- based facilitators working with the same communities in the Data Informed Practice Improvement Project. Paper three analyzes mentor teachers' discourse practices during pre-lesson conferences that are associated with student teacher learning in the Content-Focused Coaching program. The fourth presentation describes the facilitation practices of four highly rated teacher leaders in the Problem-Solving Cycle PD program. Scientific and educational relevance. The symposium contributes to the knowledge base on teacher learning and professional development. Patterns in facilitation across the four programs also have important implications for the design of PD programs.

Facilitating collaborative teacher learning in video-based PD: Moves and empirical findings

Video analysis,Teacher professional development,Reflection,Mathematics,Science education,Cooperative/collaborative learning

Martina Jerabek, Technische Universitat Munchen (TUM), Germany; Alexander Groeschner, Technische Universitat Munchen (TUM), Germany; Tina Seidel, Technische Universitat Munchen (TUM), Germany;

In (video-based) collaborative teacher development (PD) programs, the role of professional facilitation is pivotal. However, research on effective PD rarely concentrates on concrete facilitation actions (ìmovesî) and teachersí perceptions of facilitation. The aim of the present research was to identify facilitation moves and to investigate the quality of exchange among participating teachers in a new video-based PD program, the ìDialogic Video Cycleî (DVC). The DVC aims to foster teacher learning about classroom discourse. In a first feasibility study we also investigated how teachers (N=6) perceived the facilitation and the atmosphere of video-based discussions and if the exchange about video was observed as productive. Our research team ran two DVCs during the project. In a first step, video-recordings of the workshops were used to identify facilitation moves as relevant for scaffolding the exchange among teachers. Secondly, based on a high-inference rating scheme, two independent raters coded the videotaped workshops of the DVC (6 workshops, each about 2 hrs. = 344 segments). The findings show that the initiation of productive exchange about video among the teachers and the facilitator changed over the course of the DVC. Teachers increasingly initiated productive exchanges on classroom discourse and the facilitator decreasingly addressed rules for exchange and observation. In order to receive information about teacher perception of the facilitation during the DVC, the participants rated their perception at the final meeting. Findings revealed a trustful atmosphere initiated by the facilitator, a realization of each teacherís own teaching practice, and new perspectives from colleagues.

Facilitating professional learning communities among teachers: Maintaining and adapting the focus

Video analysis,Teacher professional development,Social interaction,Mathematics,Communities of learners,Cooperative/collaborative learning

Karin Brodie, Wits University, South Africa;

Professional learning communities are increasingly becoming seen as a model of professional development driven by teachers, where teachers can adopt and adapt aspects of professional development programmes to suit their own contexts. A key question is the extent to which adaption remains faithful to the original design of the professional development and the extent to which this is important. The key role of facilitators in professional learning communities suggests that their guidance is important in negotiating shifts in the focus of the communities. In this paper I analyse data of university- and school- based facilitators working with the same communities, in relation to the content focus of the conversations. Preliminary findings suggest that the university-based facilitators remain closer to the project focus and the school- based facilitators respond more to both local and, somewhat ironically, national concerns.

Discourse practices that facilitate student teacher learning in Content-Focused Coaching

Video analysis,Mentoring in teacher education,Pre-service teacher education,Mathematics,Secondary education

Fritz C. Staub, University of Zurich, Switzerland;

Content-Focused Coaching (West & Staub, 2003) is a model for professional development that is also used by mentor teachers to assist student teachers in the practicum. Central elements of the CFC model are collaborative lesson planning in pre-lesson conferences, the enactment of lessons in joint-responsibility, and collaborative reflection on lessons. Guiding tools for mentor teachers are coaching moves and a framework of core issues for the planning and reflection of lessons to deliberately focus on lesson design and content-specific learning. The goal of the study is to look for and develop mentor teachersí practices that advances teacher learning. In the context of a quasi-experimental intervention half of the 62 participating mentors were randomly assigned to an introduction on conducting pre-lesson conferences based on the CFC model. After the practicum student teachers self-assessed the extent to which pre- and post-lesson conferences advanced their learning and the extent of their competency gains in different domains. Practices of how mentor teachers facilitate dialogues and assist student teachers during lesson conferences were ascertained for all student teachers via a web-based questionnaire on the occurrence, duration and quality of pre- and post-lesson conferences. Results show the quality of dialogue, the extent of co-constructive lesson planning and the extent of feedback and reflection to be features of mentor teachersí assistance that are related to student teacher learning. The study provides evidence that discursive practices that are central features for CFC facilitate student teachers learning and can be developed in mentor teachers.

Effective facilitation of video-based discussions in the problem-solving cycle PD model

Video analysis,Teacher professional development,Problem solving,Mathematics

Hilda Borko, Stanford University, United States; Edit Khachatryan, Stanford University, United States; Charmaine Mangram, Stanford University, United States; Rajeev Virmani, University of San Francisco, United States;

The Problem-Solving Cycle (PSC) professional development program focuses on mathematics, student reasoning, and instructional practices, provides opportunities for teachers to participate collaboratively in a professional community, and is ongoing and sustainable over time. One central component is the use of video clips from teachersí classrooms as a springboard for discussions. The facilitator plays an important role by choosing appropriate video clips and guiding the discussions to focus on selected aspects of student thinking and instructional moves. The study reported in this presentation examines the facilitation moves of four highly rated PSC leaders during video-based discussions. Our initial analyses indicate that all four facilitators consistently engaged teachers in conceptually rich conversations in which they made interpretive and analytic comments about events in the video clips. They also typically connected these events to general principles of teaching and learning or proposed alternative pedagogical solutions. We are currently analyzing the facilitatorsí moves during these conversations to identify the types of moves that elicit evidence-based generalizations and pedagogical suggestions and lead to engaging discussions at a high cognitive level. Preliminary analyses suggest that there are important individual differences among the facilitators, and that there is no one ìright wayî to lead conversations in PSC workshops. This research contributes to our understanding of professional development and has implications for the preparation and support of PD leaders.

G 13

27 August 2015 08:45 - 10:15

Room Brown_B6

Symposium

Research methodology

Modelling student characteristics and development: Latent variable mixture model approaches

Keywords: Cognitive development,Cognitive skills,Developmental processes,Quantitative methods

Sig's: SIG 17 - Qualitative and Quantitative Approaches to Learning and Instruction

Chairperson: Michael Schneider, University of Trier, Germany

Organiser: Jake McMullen, University of Turku, Finland

Discussant: Sanne van der Ven, Utrecht University, Netherlands

Recent discussions have highlighted the advantages of Bayesian structural equation models for explicitly testing theoretical relationships in learning and development (Schneider & Edelsbrunner, 2013). For example, there has been a recent increase in the use of latent variable mixture models for measuring student characteristics and development, both cross-sectionally using Latent Class Analysis (LCA) and longitudinally using Latent Transition Analysis (LTA), in a number of domains including mathematics, science, and the social sciences. These methods have been found particularly useful for investigating the relationship between students' covert knowledge and their overt behavior. This symposium presents a wide overview of four studies utilizing LCA or LTA methods in students from the primary to tertiary levels of schooling. First, Edelsbrunner and colleagues use LTA to test the effects of prior knowledge of experimental design on learning about scientific concepts. Next, Hickendorff and colleagues detail three studies on the use of LCA in primary students' arithmetic problem solving and analogous reasoning. Kainulainen and colleagues then use LTA to map the conceptual change needed in coming to understand concepts of rational numbers in late primary school. Finally, Gorges and colleagues use LTA to detail the development of university students' knowledge of human memory during an introductory psychology course. The overview provided by these studies expand the boundaries of applying LCA and LTA techniques to explore theoretical relationships in students' learning and development across domains and in a number of designs, including experimental, longitudinal, and cross-sectional studies.

The influence of experimentation skills on the development of physics knowledge in primary school

Experimental studies,Student learning,Cognitive development,Science education,Primary education,Inquiry learning

Peter Edelsbrunner, ETH Zurich, Switzerland; Lennart Schalk, ETH Zurich, Switzerland; Ralph Schumacher, ETH Zurich, Switzerland; Elsbeth Stern, ETH Zurich - Research on Learning and Instruction, Switzerland;

Experimentation skills have been discussed to represent a premise for successful inquiry-based science learning. To examine whether experimentations skills indeed constrain scientific knowledge development, we analysed data from a large-scale longitudinal study in which 1265 1st to 6th grade students received inquiry-based instruction (comprising 15 units) on the topic floating and sinking. Studentsí understanding of experimentation skills as a premise was assessed before instruction. Their conceptual knowledge about floating and sinking was assessed before and after instruction. Applying latent transition analysis, studentsí experimentation skills were found to predict patterns of knowledge development in the course of the instruction. Students with less developed understanding of experimentation were more likely to show a lack of knowledge restructuring and students with better understanding were more likely to develop consistent and scientific concepts of floating and sinking. We discuss advantages of using mixture models with covariates to examine constraints on knowledge development, and implications of these findings for science education in primary school.

Using latent class models to analyze individual differences in childrenís strategy use

Quantitative methods,Student learning,Cognitive skills,Problem solving,Mathematics,Primary education

Marian Hickendorff, Leiden University, Netherlands; Marije Fagginger Auer, Leiden University, Netherlands; Claire Stevenson, Leiden University, Netherlands;

Learning and problem solving are characterized by the use of a variety of strategies, and individual differences in strategy use are an important field of study in educational and cognitive psychology. The data such research yields comprises the strategy each person used on each individual item. One way to analyze individual differences in strategy use is by applying latent class analysis (LCA), a latent variable mixture model for categorical observed variables. The aim is to identify subgroups of persons who share a similar strategy use profile on a set of problems. Three applications of LCA on childrenís strategy use in mathematics education and cognitive development are presented. The first two studies involve the solution strategies 12-year-olds use to solve multidigit multiplication problems (e.g., 56 x 23) and division problems (e.g., 544 ? 16). The third study addresses childrenís (5-11 year-olds) strategy use on analogical reasoning problems.

A latent class analysis of elementary school students' rational number concepts

Quantitative methods,Student learning,Cognitive development,Conceptual change,Mathematics,Primary education

Mikko Kainulainen, University of Turku, Finland; Jake McMullen, University of Turku, Finland; Erno Lehtinen, University of Turku, Finland;

Rational numbers extend the number concept to new dimensions that have repeatedly proven to be problematic to learn regardless of age. Misconceptions brought about by the transition to these new dimensions often have their roots in the so called Natural Number Bias (NNB) where students continue to apply natural number rules for rational numbers. A longitudinal study is presented in which the early development of the rational numbers concept in 4thñ6th grade students is investigated. The participants (n = 243) were tested in the beginning and in the end of their school term through a test that included both open-ended and multiple-choice items about the size of fractions and decimals. The answers for fraction and decimal items were coded on the basis of two separate outputs: correct answers and answers that were based on NNB. This data was further treated with a Latent Class Analysis which supported a five class model of studentís knowledge of the size of rational numbers. These classes show widespread NNB and conceptual fragmentation among students. The crosstabulation of the classes between the two time-points shows stability only in the class where students answer most of the questions correctly and the NNB is non-existent. Movement between other classes manifests itself as very fragmented. Overall, the development of students' rational number concept is very low. This suggests that the instruction used in schools may not match the complexity of the change needed in studentsí number concepts.

A latent transition analysis of psychology studentsí developing understanding of human memory

Quantitative methods,Student learning,Conceptual change,Developmental processes,Social sciences,Higher education

Johannes Franz Gorges, Universitat Trier, Germany; Michael Schneider, University of Trier, Germany; Anne-Kathrin Mayer, ZPID - Leibniz Institute for Psychology Information, Germany;

The role of conceptual change as learning mechanism in higher education has gained relatively little attention in research so far. In the current study, we investigated Psychology studentsí conceptual change with respect to the mechanisms of human memory, in particular, whether they saw memory as a system for static storage or for active processing of memories. Research on conceptual change in other content domains demonstrated that prior knowledge determines further learning. Learners can differ strongly not only in the content of their prior knowledge but also in how fragmented or integrated their knowledge is. Schneider and Hardy (2013) demonstrated that latent profile transition models can be used to model such individual differences in pathways of conceptual change in the domain of elementary school studentsí understanding of floating and sinking. In the current study we examined whether the approach can also be used for modeling university studentsí learning about human memory across three measurement points. The analysis revealed four latent classes of persons which differed systematically in their conceptual knowledge. The majority of students were on five developmental pathways between these profiles. The pathways indicate a developmental ordering of the knowledge profiles from less to more advanced. The degree of knowledge integration increased on some paths and remained stable on others. Subsequent studies can now try to identify educational influences and individual differences between learners, e.g. in learning strategies or in working memory capacity, that are associated with the different pathways of conceptual change in higher education.

G 14

27 August 2015 08:45 - 10:15

Room Green_A3

Symposium

Mathematics education

The influence of language use and language competence on learning in mathematics and science

Keywords: Bilingual education,Cognitive skills,Language (Foreign and second),Learning and developmental difficulties,Mathematics,Science education

Sig's: SIG 10 - Social Interaction in Learning and Instruction

Chairperson: Ilonca Hardy, Goethe-Universitat Frankfurt, Germany

Organiser: Henrik Saalbach, University of Leipzig, Germany

Discussant: Joyce Moore, University of Iowa, United States

The influence of language on learning is at least threefold: First, instructions and explanations are grounded in linguistic communication. Second, language functions as means of representing the acquired knowledge. And third, linguistic interaction induces children to take different conceptual perspectives. Coordinating different views, for example within cooperative learning arrangements, contributes to the development of argumentation and self-reflective thinking. All three dimensions of language are highly relevant for learning and instruction at school. In fact, language proficiency is one of the most important domain-general predictors of school achievement. This is particular true for students with multilingual background since they face the challenge to acquire conceptual understanding while refining their language competencies in a second language. In this symposium, we consider the intricate relationship between language use and proficiency and the processes of cognitive modeling and knowledge representation with respect to monolingual and multilingual students' learning in mathematics and science. In particular, the papers of the symposium examine the different aspects of language or multilingualism most relevant for the disadvantages or cognitive costs which multilingual learners often face. To this aim, two papers investigate the relation between various language skills and the ability to solve mathematical word problems in primary school students with a multilingual background. A third paper examines the importance of teacher-student and student-student discourse and specific language-based scaffolds for the development of domain-specific language skills and conceptual understanding in a preschool science context. Finally, the fourth paper explores to what extent bilingual students represent mathematics content in the instructional language and what cognitive costs occur when retrieving knowledge in their other language.

Language-dependent knowledge acquisition: Investigating bilingual arithmetic learning

Experimental studies,Bilingual education,Numeracy,Language (Foreign and second),Mathematics

Christian Hahn, University of Gottingen, Germany; Henrik Saalbach, University of Leipzig, Germany; Roland Grabner, University of Graz, Austria;

In light of the increasing number of bilingual education programs, the question of whether knowledge is represented in a language-dependent way, has gained high practical importance. First studies on fact knowledge have revealed that content learned in one language can be retrieved and applied more slowly and less accurate when participants have to switch the language from instruction to testing compared to conditions when the language remains the same. This has been mainly demonstrated for arithmetic facts (e.g., the multiplication table). Previous studies in this domain, however, have used visual stimuli (i.e., written number words), which display a low ecological validity for the classroom setting. In addition, it remained unclear whether the language-switching costs in arithmetic facts may be associated with specific

calculation procedures and arithmetic operations or whether they also emerge when pure fact learning is required. The aim of the present study was to investigate language switching costs in arithmetic using ecologically-valid auditory stimuli and to compare these costs between different arithmetic operations and typical vs. pure fact learning. Thirty-three university students had to learn 18 facts of three different operations over a period of 4 days. Besides multiplication and subtraction problems, a third category (i.e. artificial problems) was included to investigate language switching costs for pure fact learning. When tested on day 5, participants showed significantly lengthened response times for the language-switching condition compared to the no-switching condition for all three operations. This effect interacted with the chronological order in which the problems were presented.

Developmental relations between second language proficiency and word problem solving

Quantitative methods,Student learning,Problem solving,Language (Foreign and second),Mathematics,Primary education

Jennifer Paetsch, Humboldt-Universitat zu Berlin , Germany; Anja Felbrich, Humboldt-Universitat Berlin , Germany; Petra Stanat, Humboldt Universitaet Berlin, Germany;

Weak language skills in the language of instruction are assumed to be a key factor in contrib-uting to the lower mathematics competencies of immigrant students. In math, good language skills are especially needed for solving word problems. This study applied latent change mod-eling to investigate the relation between language skills and the ability to solve word problems in second-language learners. Participants included 370 second-language learners who were assessed from the beginning to the end of Grade 3. The results showed that in addition to reading comprehension, grammar proficiency was also linked to word problem solving. More-over, changes in second-language proficiency were significantly correlated with changes in word problem solving. Thus, our findings revealed that second-language learners have to rise to a special challenge because they must develop language skills in the language of instruction and mathematical skills at the same time.

Language scaffolding to promote second language learners` acquisition of early science concepts

Quantitative methods,Second language acquisition,At-risk students,Language (Foreign and second),Physical Sciences,Early childhood education

Sarah Kloster, Frankfurt University, Germany; Ilonca Hardy, Goethe-Universitat Frankfurt, Germany; Henrik Saalbach, University of Leipzig, Germany;

According to assumptions of contextual learning theories, language functions a mental tool for the construction and negotiation of (conceptual) meaning. Verbal scaffolding in terms of adultsí modeling and focusing sophisticated language use during learning activities may be especially helpful for learners with low language proficiencies. In the present study, we employed language support in an early science learning context, providing basic (academic) vocabulary, relational language and structures, and description of scientific activities (e.g., predicting). In an

experimental repeated measures design, we investigated the impact of linguistic scaffolding by the teacher in homogeneous (group 1) and heterogeneous (group 2) language groups, assuming an additional impact of scaffolding by native speakers in collaborative pair settings. In the control group, the children were provided with teacher-supported discourse but did not interact with each other in peer activities. A total of 70 preschool students with German as a second language participated in small-group trainings on two consecutive days in the domain of magnetism. We found that studentsí conceptual understanding related to material kind and magnets significantly improved in all conditions after the training with no difference between the three intervention groups and a significant difference to an untrained baseline group. With respect to the test of academic vocabulary in German, both the experimental groups with heterogeneous and with homogeneous pairings outperformed the control group. Results point to the importance of context-embedded peer interactions for the acquisition of vocabulary while native speakers do not seem to contribute to meaning construction beyond teacher-supported discourse.

Relationship between (below-average) mathematics achievement and bilingualism: an exploratory study

Quantitative methods,At-risk students,Learning and developmental difficulties,Language (Foreign and second),Mathematics,Primary education

Verena Schindler, Padagogische Hochschule Bern, Switzerland; Elisabeth Moser Opitz, University of Zurich , Switzerland;

Several investigations have shown that pupils with German as a second language (L2G) are disadvantaged in mathematics instruction. Several causes are discussed: SES, linguistic factors of the German language, knowledge of mathematical language (mathematical vocabulary, numerals) and dealing with word problems. However, some of the mentioned difficulties are also apparent among low achievers in mathematics (LAMath) with L1 German (L1G). Therefore, it is interesting to ascertain what relationship exists between mathematics achievement and selected language variables in pupils with L2G compared to a sample of LAMath with L1G. Two samples with matched pairs are examined: 21 pairs with below-average mathematics achievements (sample LAMath; one pupil with L1G, one pupil with L2G) matched for mathematics achievement, IQ, age and sex, and 21 pairs with L2G (sample L2G; one pupil with average and one with below-average mathematics achievement) matched for IQ, age and sex. Besides mathematics achievement, IQ, SES and age, data on the following variables were gathered: retentivity, processing speed, understanding of prepositions, sentence formation, plural formation, putting pictures into words, reading comprehension as well as solving word problems and verbal counting. The results for the L2G pairs with differing mathematics achievement levels indicate that the differences regarding mathematics achievement are attributable to factors other than the examined language and memory variables. In the sample LAMath , IQ proved to be the strongest predictor, followed by a total score of several language variables. No influence of the variable bilingualism on mathematics achievement was demonstrated

27 August 2015 08:45 - 10:15

Room Yellow_G3

Symposium

Higher education

Towards Reflective Academia: Promoting Academic Integrity

Keywords: Educational technology,History,Motivation and emotion,Video analysis

Sig's: SIG 4 - Higher Education

Chairperson: Erika Lofstrom, University of Helsinki, Finland

Organiser: Erika Lofstrom, University of Helsinki, Finland

Discussant: Lynn McAlpine, University of Oxford, United Kingdom

Members of academia are expected to exhibit qualities related to integrity (Bertram Gallant 2008) and students are expected to learn about research ethics and exhibit integrity as part of their competences. Growing concerns over research misconduct (Martinson et al. 2005; Titus et al. 2008) suggest that maintaining academic integrity has become increasingly challenging for academia. In order to understand how integrity might be promoted and what features in the academic environment support or inhibit integrity, this symposium explores the topic through four individual papers addressing various aspects of integrity. The papers focus on the phenomenon of plagiarism, ethics training needs and institutional integrity policy. The papers employ various methodological approaches. Three of the papers rely on interview data analyzing. One of the papers is a theoretical exploration that builds on the researchers' prior research utilizing Q-methodology. The current selection of papers contribute to the literature in the field by highlighting educators' (supervisors, university lecturers and professors) and students' views on academic integrity and the broader frame of institutional integrity policy. References Bertram Gallant, T. (2008). Academic Integrity in the Twenty-First Century: A Teaching and Learning Imperative. ASHE Higher Education Report, 33(5) 1-143. Martinson, B. C., Anderson, M. S., & de Vries, R. (2005). Scientists behaving badly. Nature 435, 737-738. Titus, S. L., Wells, J. A., & Rhoades, L. J. (2008). Repairing research integrity. Nature, 453, 980-982.

Academics talking about student plagiarism: A discourse analysis

Conversation/ Discourse analysis,Student learning,Morality,Writing/Literacy,Higher education

Anne Nevgi, University of Helsinki, Finland; Erika Lofstrom, University of Helsinki, Finland; Sanna Vehvilainen, Centre for Research and Development of Higher Education, Finland;

The increased focus on combating plagiarism signals that student writing tasks expose problems that academic institutions face. Simultaneously, the use of plagiarism detection software has become increasingly more common practice at institutions of higher education suggesting that academia, indeed, struggles to maintain a proactive approach. The aim of this study was to understand the nature of these proposed and perhaps contradictory trends through discourses on plagiarism among academic staff. Through reflective interview we sought the experiences of teachers who had encountered student plagiarism and would be in a position to reflect on their experiences and reactions. The data constituted of eleven university teachersí interviews and one university teacherís observation diary. The university teachers represent various disciplines from natural and life sciences, humanities and social sciences. We explored the discourses by analysing how university teachers position themselves in relation to the phenomenon of plagiarism, the student, and the academic community and its conventions of scholarly writing. We identified a Discourse of Gatekeeping, i.e. teachers as guardians of standards in academia; a Discourse of Care, i.e. teachers as professionals supporting their students through difficulties in academic literacy; and a Discourse of Power, i.e. a counter-discourse related to îotheringî in academia.

Undergraduate students' views on plagiarism and academic dishonesty

Qualitative methods,Student learning,Attitudes and beliefs,Morality,Writing/Literacy,Higher education

Marvi Remmik, University of Tartu, Estonia; Liina Lepp, University of Tartu, Estonia;

Understanding how students think about, and which are their attitudes toward academic dishonesty could help to reduce the incidence of academic dishonesty. The aim of this study was to ascertain what is regarded as academic dishonesty by undergraduate students and what in their opinion should be done to avoid academic dishonesty. The presentation is based on semi-structured interviews with 24 undergraduate students. Results of the study indicated that undergraduate students mostly regarded academic dishonesty to be cheating at exams and telling answers to their fellow students. As for the reasons, the participants inter alia mentioned university teachersí indifferent attitude, who as if prompt students to cheat and encourage it. It was also mentioned in the interviews that university teachers themselves also provide a negative model for students when often failing to add references to slideshow slides etc. The reasons seen behind academic dishonesty in universities were things taking place at general education schools: at general education schools there is almost no attention paid to correct referencing and to the need for referencing at all.

Academic staffís views on research ethics training

Content analysis,Student learning,Teaching/instruction,Morality,Interdisciplinary,Higher education

Heidi Hyytinen, University of Helsinki, Finland; Erika Lofstrom, University of Helsinki, Finland;

The focus of this paper is on academicsí views on research ethics training. Our aim is to explore to what extent academicsí views are projected in terms of explicit versus implicit teaching. The interview data (n= 7) were analyzed using content analysis. The results showed that all academics interviewed shared the view that academics have the knowledge to teach research integrity. However, many of them felt that they themselves needed pedagogical training for research ethics. Most of these academics agreed that the best learning results are obtained by teaching research ethical understanding, not only rules or guidelines. They expressed that learning research ethics is integrated with learning how to do research. Reflection was also seen as an essential part of the learning process. However, some of the academics described that learning research ethics takes place implicitly, that is, there is no need to explicitly teach these issues. Similarly, the academicsí views on the issue of how to deal with alleged cases of misconduct varied. While many of the academics considered that a proactive approach is the best way to prevent misconduct, some academics trusted more the use of sanctions. The results suggest that if academic integrity is not acknowledged in curricula and course outlines, there is a risk that it remains a coincidental topic in most courses.

Teaching academic integrity in higher education: key issues and related policies in two institutions

Educational policy,Teaching/instruction,Attitudes and beliefs,Morality,Interdisciplinary,Higher education

Erika Lofstrom, University of Helsinki, Finland; Kerry Shephard, University of Otago, New Zealand; Tiffany Trotman, University of Otago, New Zealand; Mary Furnari, University of Otago, New Zealand;

In this paper we elaborate on aspects of academic integrity that emerged in our prior study utilizing Q-methodology (Authors 2014), in which we explored academicsí conceptions about their role in promoting academic integrity in higher education in the context of research-supervision, in two higher education institutions in different regions of the world. The results suggested that university academics may be divided into five groups on the basis of strong but qualitatively different views that these groups have on several key aspects of teaching academic and research integrity. In this presentation we review literature on six key aspects that academics either have a) strong, but qualitatively different views on or b) all groups had ambiguous views on. In the first category these include 1) how best to teach academic and research integrity to our students; 2) whose responsibility it is to teach it; 3) on the most appropriate source of moral direction; The second category includes 4) on the need for academic development for academic integrity; 5) on how student collaboration for learning may be negatively impacted by institutional measures in support of integrity, and 6) on the role of whistle blowing in achieving integrity. We view the integrity policies of our institutions from these six perspectives in order to understand how policy and strategy elements contextualise these six contested areas.

G 16

27 August 2015 08:45 - 10:15

Room Green_A5

Symposium

Learning in context

Focus on teacher-pupil interaction as a means to improve pupilsí science performance

Keywords: Learning in context,Primary education,Science education,Student learning,Teacher professional development,Video analysis

Sig's: SIG 10 - Social Interaction in Learning and Instruction

Chairperson: Henderien Steenbeek, University of Groningen, Netherlands

Organiser: Sabine van Vondel, University of Groningen, Netherlands

Organiser: Astrid Menninga, University of Groningen, Netherlands

Discussant: Paola Uccelli, Harvard University, United States

Curious Minds, a Dutch nationwide research program, focuses on elementary pupils' knowledge and skills in science and technology (S&T-) disciplines, and how pupils' abilities can be optimally stimulated making use of environmental factors, such as teacher instructions or activities. The presentations in this symposium all shed a light on the importance of studying social interaction in the classroom during S&T-activities, and the impact of interventions aimed at improving interaction and subsequently pupils' science learning. Specifically, the focus is on the teacher's role in stimulating pupils' S&T-performance and academic language skills. In each presentation macro-measures, such as attitude questionnaires, or microgenetic-measurements, i.e., teacher-pupil interactions in the classroom, or both will be addressed to get a grip on important interaction processes in the classroom. Firstly, Menninga addresses specific language use of lower grade teachers and that of the pupils during a Video Feedback Coaching program (VFC). Secondly, Geveke describes the interaction of teacher questioning and students performance during an in- and out-of-school science program. Thirdly, van Vondel focuses on both interaction-data and teacher's S&T-attitude in order to assess the effectiveness of a VFC for upper grade teachers. Lastly, Thys describes how teacher's attitude predict the quality of the interactions with students during a standardized activity. An expert in the field, Uccelli, will discuss current insights in teacher-pupil interactions to show how teachers can use language to support optimal learning processes.

Importance of language during science and technology lessons in kindergarten

Video analysis,Student learning,Social interaction,Science education,Primary education,Learning in context

Astrid Menninga, University of Groningen, Netherlands; Marijn Van Dijk, University of Groningen, Netherlands; Paul van Geert, University of Groningen, Netherlands;

The aim of this study was to gain insight into the academic language use of teachers and their pupils during science and technology lessons, and the relation between the two. The findings contribute to the existing literature on natural teacher-child dynamics and the role of linguistic scaffolding, and the findings result in practical implications for teachers regarding the role of language in science and technology education. Repeated video-recordings (n=8) of eleven teachers with a small teaching group, who participated in an intervention study based on video feedback coaching, were transcribed and their language use was analyzed. Results indicated interesting differences between Kindergarten and first grade teachers. For utterance length and lexical diversity, we saw a clear decrease for the first grade teachers whereas the Kindergarten teachers remained rather stable over time. The pupils, in Kindergarten and first grade, showed an increase of utterance length in the course of the intervention. In future analyses, we want to relate these findings to the questions posed by the teacher and the pupilsí complexity level of scientific reasoning. At first sight, the intervention does not seem to increase the academic language of the teacher, but rather affects the amount of speaking time of the teacher. The pupils, however, produce longer sentences which can be an indication of more complex language use at that age. To conclude, the intervention in which questioning and language components are included is maybe too intensive for teachers who have never taught science and technology before.

Improving pupilsí conceptual understanding by an in- and out-of-school science program

Video analysis,Teaching/instruction,Cognitive development,Science education,Out-of-school learning,Learning in context

Carla Geveke, University of Groningen/ Hanze University of applied sciences, Netherlands; Henderien Steenbeek, University of Groningen, Netherlands; Jeanette Doornenbal, Hanze University of applied Science, Netherlands; Paul van Geert, University of Groningen, Netherlands;

Research in the field of out-of-school science is gradually increasing. These programs are considered to be important, yet more evidence about the learning effect is needed. This study aims to contribute to that matter by means of microgenetic measurements. We wanted to answer the question: How is the quality of a science program and its implementation related to the pupilsí performances? We used a multiple case study design with two contrasting cases with either a qualitatively optimal or marginal version of the program, and two similar cases of semi-optimal program quality. The quality of the program was determined by two indicators: a preparation in the classroom prior to the out-of-school visit, and the amount of lessons given by teachers/educators who are preliminary trained in using an open teaching style focused on eliciting conceptual understanding. The cases were upper grade elementary school classes . The effect of the program was measured by coding pupilsí performance with a scale based on skill theory and the teacherís support was measured with the Openness Scale. We found the highest learning effect in the optimal case, meaning it is favorable to use a science program of high quality, including preparation and lessons given by qualified teachers implementing the program according to its goals.

ëLooking atí an intervention: Assessing the effectiveness of a video feedback coaching intervention

Mixed-method research,Teacher professional development,Social interaction,Science education,Primary education,Learning in context

Sabine van Vondel, University of Groningen, Netherlands; Henderien Steenbeek, University of Groningen, Netherlands; Paul van Geert, University of Groningen, Netherlands;

Recently, the quality of science and technology (S&T-)education has been often the subject of study. By implementing the Video Feedback Coaching program for upper grade teachers (VFCt), as presented in this study, we aim to support teachers in improving S&T-education by focusing on their behavior, i.e., their questioning, when creating powerful learning environments in which pupilsí scientific reasoning skills can be stimulated. During this presentation we aim to demonstrate the surplus value of using a mixed method approach when assessing the effectiveness of a VFCt. The focus of this intervention is on how teachers can stimulate pupilsí scientific reasoning skills. As the teacher-pupil interaction is a main element during the VFCt it should be an important element when assessing the effectiveness of the intervention. In addition, teachers attitudes towards science teaching have an influence on their behavioral intention to teach science. Attitude is therefore, measured using a questionnaire during pre- and post-measure. Nine teachers and their upper grade classrooms participated. Results show positive changes in both teachersí S&T-attitudes and interaction patterns. By focusing on behavioral data, using microgenetic measurements (n=8), we show a more thorough and multifaceted view of the teacherís professional development ñand by that the quality of the intervention- next to comparing pre- and post-measures. When more understanding is gained about what happens during the intervention, for instance about stability or change in interaction patterns, intervention programs can be specifically attuned to supporting high quality interaction patterns in the classroom in which pupils are stimulated to reason scientifically.

Relation between teachersí attitudes towards science and technology and their classroom interactions

Mixed-method research,Teaching/instruction,Attitudes and beliefs,Science education,Primary education,Learning in context

Miranda Thys, KU Leuven, Belgium; Ferre Laevers, KU Leuven, Belgium;

Teachersí attitudes towards science and technology (S&T) are of importance for their actual practice. This study explores whether these attitudes predict the quality of different dimensions of classroom interactions. Twenty-seven elementary school teachers participated. The teachers were asked to conduct a standardized activity, called ëBuilding a Bridgeí, with their students. The quality of the interactions as it unfold during the activity was measured with the Classroom Assessment Scoring System Upper Elementary (Pianta, Hamre, & Mintz, 2012). Teachersí attitudes towards science (inquiry) and technology (design) and the teaching in these fields were measured with a questionnaire developed by Walma van der Molen (2007) and adapted by the Dutch organization Oberon (2009). Correlations were found between different aspects of

teachersí attitudes and different dimensions of classroom interactions. The intention to invest time and energy in technology in the future explained some of the variance in the relationship with analysis and inquiry on the one hand and with teacher sensitivity on the other hand. Self-efficacy towards teaching design showed to be a significant predictor of the dimension instructional dialogue. Especially the provision of opportunities for inquiry and possibilities to discuss ideas with each other are of particular importance for S&T- education and may be enhanced by positive teacher attitudes.

G 17

27 August 2015 08:45 - 10:15

Room Cyan_F1

Symposium

Reading comprehension

Implementing Reciprocal Teaching in Classrooms: Promoting Reading Strategies and Comprehension

Keywords: Primary education,Quantitative methods,Reading comprehension,Secondary education,Self-regulation,Teaching/instruction

Sig's: SIG 6 - Instructional Design

Chairperson: Amos Van Gelderen, University of Amsterdam, Netherlands

Organiser: Mariska Okkinga, Twente University, Netherlands

Organiser: Wilhelmina Julia Westera, University of Auckland, New Zealand

Discussant: Hilde Van Keer, Ghent University, Belgium

Reciprocal Teaching (RT) is a method of instructing, teaching and guiding learners in reading comprehension. Central to RT is teaching comprehension-fostering reading strategies (e.g. predicting, clarifying, summarizing, questioning) while students practice together in a text-focused dialogue in small collaborative groups, supported by their teacher through expert modeling and scaffolding. Although RT was initially designed as a small-group tutoring method with researchers as trainers, RT is increasingly practiced in regular classroom settings. However, the effectiveness of RT in ecological valid settings (i.e. in regular classrooms) has not been studied extensively yet. In this symposium, different aspects of implementing RT in classrooms are considered. The first study investigates the impact of an adapted version of RT in 5 classrooms with 8-11 year-olds. The adaptions included explicit teaching of inferential questioning and activation of prior knowledge. The second study, with low-achieving adolescents, the focus is on implementation quality by regular teachers and to what extent effects

of RT are dependent on teacher behavior. In the third study, traditional RT is contrasted with an intervention combining RT with explicit instruction in self-regulated learning, to foster collaboration within groups of 5th grade students learning together. The fourth study explores the differential effects of a class-based RT program on the comprehension process of individual low achieving adolescents. Different developmental patterns in those students were discerned.

Reciprocal teaching -Towards high impact results: Inferential questioning and other key elements

Experimental studies,Instructional design,Comprehension of text and graphics,Reading comprehension,Cooperative/collaborative learning

Wilhelmina Julia Westera, University of Auckland, New Zealand;

Reciprocal teaching is a multiple-strategy instruction method that was ranked as third out of the 49 most effective teaching strategies (Hattie, 2009). Reciprocal teaching can accelerate literacy achievement, as measured on standardised tests, in a relatively short period of time while building deeper (higher order) thinking and collaborative skills. Identifying adaptions associated with accelerated gains is pertinent to designing reciprocal teaching for high impact. In a New Zealand study in multicultural secondary schools, an entire cohort of first year secondary school students made accelerated gains in deeper thinking skills with an adapted version of traditional reciprocal teaching. Adaptions included activation of prior knowledge, explicit teaching of inferential questioning and a continuous intensive scaffolded approach, by a skilled trained in-class teaching team in a school-wide approach. This paper presents a quasi-experimental design study that replicates the adapted version in a multicultural primary school, with younger students (aged between 8 and 11 years) and their 5 teachers. The results of the intervention were similar to those of the secondary school study. Both interventions resulted in large effect sizes for reading comprehension scores on standardised tests, irrespective of prior achievement, gender or ethnicity. In both studies students also made greater gains on deep feature reading comprehension scores than on surface feature scores. The intervention in the primary school study also resulted in a medium effect size for reading accuracy scores. Theoretical and practical implications are outlined, including the importance of robust combinations of key elements and integrity to inform implementation design.

Effects of reciprocal teaching: A two-year intervention study among low achieving adolescents

Experimental studies,Instructional design,Teaching/instruction,Comprehension of text and graphics,Reading comprehension,Secondary education

Mariska Okkinga, Twente University, Netherlands; Amos van Gelderen, University of Amsterdam, Netherlands; Peter Sleegers, Twente University, Netherlands; Roel van Steensel, Erasmus University Rotterdam, Netherlands;

Low achieving adolescents are known to have difficulties with reading comprehension. This presentation discusses how reciprocal teaching can improve low achieving adolescents' reading

comprehension in natural classroom settings (as opposed to small-group settings) and to what extent intervention effects are dependent on teacher behavior. Over the course of two years, experimental teachers were given extensive training and coaching aimed at using principles of reciprocal teaching, while control teachers used their regular teaching method. Observations of teacher behavior were focused on instruction of reading strategies, modeling, and support of group work, and were performed in both experimental and control classes. Our study shows that reciprocal teaching contributed to adolescent low achievers' growth in reading comprehension only when experimental teachers provided adequate modeling. In addition, results suggest that the quality of implementation of reciprocal teaching in natural classroom settings should receive more research attention. Implications for educational practice are discussed.

Are intensity of collaboration and feedback quality the keys to the success of reciprocal teaching?

Experimental studies,Teaching/instruction,Comprehension of text and graphics,Self-regulation,Reading comprehension,Primary education

Nina Schuenemann, Justus Liebig University Giessen, Germany; Nadine Sporer, University of Potsdam, Germany;

In this classroom intervention study, we contrasted a traditional reciprocal teaching condition (RT) with an intervention condition that combined reciprocal teaching of reading strategies with explicit instruction in self-regulated learning (RT + SRL) in whole-class settings. In detail, we concentrated on group processes during training. With multiple learning groups in one classroom, teacher support is not as extensive as in small learning groups. Therefore, students need to collaborate more intensely and provide helpful feedback to each other to compensate for this support loss. We hypothesized (a) that the intensity of collaboration in the groups and the quality of provided peer feedback are critical features of successful RT; (b) that these group processes determine the success of an intervention with regard to their promotive influence on studentsí strategic reading and reading comprehension; and (c) that the integration of self-regulatory procedures increases the group work quality in whole-class settings. In a twolevel multiple mediator model, the following results emerged: Relative to RT groups, RT + SRL groups were found to collaborate more intensely and to provide higher quality peer feedback in their reading groups. Results indicate that integrating SRL procedures in traditional RT in whole-class settings increases the quality of small group collaboration and feedback processes. Furthermore, high quality peer feedback is an effective means to foster studentsí long-term strategic reading competence.

Development of individual self-regulation and reading task approach in a reciprocal teaching context

Video analysis,Student learning,Developmental processes,Self-regulation,Reading comprehension,Secondary education

Mirjam de Bruijne, Universiteit Leiden, Netherlands; Amos van Gelderen, University of Amsterdam, Netherlands; Paul van den Broek, Leiden University, Netherlands;

Many low-achieving students experience problems with reading comprehension. Reciprocal teaching (RT), a method consisting of modeling, expert scaffolding and guided practicing of reading strategy use in the context of small group interaction, has proven effective in stimulating reading comprehension growth in poor readers. Modern reading intervention programs therefore often incorporate elements of RT. However, not all students benefit equally from class based interventions and attendance to individual differences in comprehension development under the influence of an intervention is needed. Furthermore, little research attention has yet been paid at all to differences within the subgroup of poor readers, although these differences may be of instructional relevance. This presentation explores the development of reading task approach and self-regulation processes in individual students in the context of a classroom based reading intervention employing principles of reciprocal teaching. Participants were 20 low-achieving adolescents from five different schools in The Netherlands, selected from intervention classrooms. Over the course of two school years the students performed four think-aloud reading tasks (expository texts with comprehension questions). They were told to approach the tasks as they thought adequate and would normally approach similar school reading tasks. All task performances were video-taped. Analyses of the video recordings revealed substantial variation in task approach and self-regulation between students but a relatively stable approach within students over time, suggesting that the intervention program did not deeply affect studentsí reading comprehension process. However, small changes in individual task performance did occur. Various developmental patterns will be presented.

G 18

27 August 2015 08:45 - 10:15

Room Green_A6

Symposium

Early childhood education

Mathematical skills development and intervention in early school years

Keywords: Cognitive skills,Early childhood education,Learning and developmental difficulties,Numeracy,Special education

Sig's: SIG 5 - Learning and Development in Early Childhood

Chairperson: Pirjo Aunio, University of Helsinki, Finland

Organiser: Pirjo Aunio, University of Helsinki, Finland

Discussant: Annemie Desoete, Ghent University & Artevelde University College, Belgium

Currently some models of early mathematical development has been published (Fritz, Ehlert & Balzer 2013, Sarama & Clements 2010; Krajewski & Schneider, 2009) and some are

forthcoming (Aunio & R?s?nen, in press). The models have some similar, but also distinguish features. The aim of this symposium is to investigate the development of early math skills from different theoretical viewpoints by using longitudinal, cross-sectional and intervention data. The papers present a continuum from math skills development and cognitive factors (Hong Kong) to different math skills development in two different societies (Germany and South Africa) and ending with an early math intervention study (Finland). Zhang et al. paper show that mental rotation ability is associated with performance in subtraction and that this relation was mediated with backward counting skills in Chinese kindergarteners. Ehlert et al. demonstrate that in German first and second grade students altering the number range made the arithmetical tasks more difficult in a hierarchical manner. Henning et al. report that the development of mathematical skills in 4-8 year old South-African children (using Afrikaans, IsiZulu, Sesotho or English) mainly follows the developmental paths theorized by Friz-Stratmann and Ehlert theory. Mononen et al. show that mathematical skills short intervention is able to increase the level of early numeracy skills in kindergarteners with low performance. The theoretical and educational significance becomes from the growing knowledge of what is important in mathematical skills development and what are the potential elements in supporting the development in the beginning of the school career.

Solving subtraction problems relies on mental rotation ability: A study of Chinese pre-schoolers

Quantitative methods,Student learning,Cognitive skills,Numeracy,Mathematics,Early childhood education

Xiao Zhang, The Hong Kong Institute of Education, Hong Kong; Dan Lin, Department of Psychological Studies, The Hong Kong Institute of Education, Hong Kong;

Based on a sample of 71 Chinese children aged around 6 years, the present study examined whether mental rotation ability contributes specifically to childrenís early learning of subtraction but not to their learning of addition and explored whether backward counting explained the relation between mental rotation and subtraction. The results showed that mental rotation ability was associated with performance in subtraction but not that in addition and that this relation was fully mediated by backward counting even after taking into account the influence of phonological awareness. Findings highlight the importance of examining the specificity of the cognitive process that underlies childrenís learning of subtraction. Implications for educational practices were also discussed.

The arithmetic concept understanding in extended number ranges at the end of grade 1

Quantitative methods,Student learning,Achievement,Numeracy,Early childhood education

Antje Ehlert, University of Duisburg-Essen, Germany; Annemarie Fritz-Stratmann, University of Duisburg-Essen, Germany;

Mathematical competencies and arithmetical knowledge are gradually acquired and hierarchically built on one another (Fuson, 1988). All previously published articles on

developing arithmetical concepts mainly focus on the smaller number range from 1-10 (Fritz, Ehlert & Balzer, 2013; Fuson, 1988). Still relatively unknown is how those concepts are acquired by children in the extended number range. For this reason we planned an exploratory study and asked whether arithmetic concepts develop in the extended number range according to the theory by Fritz, Ehlert & Balzer (2013) and how the individual conceptual developments of complex number ranges are connected. 76 children were tested at the end of grade 1, resp. at the beginning of grade 2. They were tested with the MARKO-D1 (Fritz, Ehlert, Ricken & Balzer, in print). Additionally, they solved tasks within the larger number range derived from the MARKO-D1-Test. The number range was systematically extended: between 10 and 20; between 30 and 40. The IRT based results show that items are mainly arranged hierarchically in accordance to the main theoretical assumption. Assuming a successive acquisition of arithmetical concepts even in the respective number range extensions results show that depending on the number range extension the tasks of equal concepts vary in difficulty: the higher the number, the more difficult are the tasks of the same concept. Interpreting the content of the results it means that the concepts are acquired in a small number range first and are shifted in the extended number range later.

Assessing first grade childrenís mathematical competence in South-Africa

Quantitative methods,Student learning,Cognitive skills,Numeracy,Early childhood education

Elizabeth Henning, University of Johannesburg, South Africa; Lars Balzer, Swiss Institute for Vocational Education, Switzerland; Lara Ragpot, University of Johannesburg, South Africa; Roelien Herholdt, JET Education Services ñ Johannesburg, South Africa;

The results of the most recent of three rounds of testing of first grade childrenís number concept development and calculation competence will be presented. The test was designed and standardised in Germany, from where it was imported to South Africa. After translation into four South African languages and piloted and refined in 2012 and 2013, the test has been administered to more children, aiming to find, by way of Rasch modelling, if the test will ësurviveí the migration into a very different sociocultural and linguistic context. With language adjustments to specific troublesome items, the test, known by its acronym, MARKO-D, is proving to be sufficiently robust in its translations. Working from a framework of cognitive developmental psychology theory, with behavioural data literature and also some literature on the neuroscience of number concept, we emphasis the function of early language development as it intersects with number concept development. The implications for test development and utilisation in a multilingual education system are discussed, pointing to linguistic minutiae such as prepositions and adverbs that differ lexically and semantically in South African.

Intensified mathematical support for low-performing kindergartners

Experimental studies,Student learning,Cognitive skills,Numeracy,Early childhood education

Riikka Mononen, University of Helsinki, Finland; Anna Tapola, University of Helsinki, Finland; Pirjo Aunio, University of Helsinki, Finland;

The aim of this study was to examine the effectiveness of early mathematical intervention, ThinkMath-K, for Finnish kindergartners (Mage = 6 y. 3 m.) with low performance in mathematical skills. Trained teachers provided intervention for 38 low-performing children in 15 sessions of 35ñ45 minutes each, during two months. Childrenís mathematical skills were measured before the intervention phase and immediately and three months after the intervention. In the analyses, we divided low-performing children to those who performed at or below the 10th percentile and those who performed between 11ñ25th percentile in the mathematics pre-test. Childrenís development in mathematical skills was compared among four subgroups: very low-performing intervention group (LOWi10, n = 20), the low-performing intervention group (LOWi11ñ25, n = 18), the low-performing control group (LOWc11ñ25, n = 14), and the average performing control group (AVEc, n = 137). From pre-test to immediate post-test, all low-performing children had a steeper increase in their mathematical performance compared to the AVEc children. Further analyses at the individual level showed that the number of intervention children who reached the level of average performance at post-test was higher (66.7%) among the children with low performance than those with very low performance (35%). The pattern of development changed after the intervention had ended, as some children showed decrease in their performance. The results highlight the importance of using follow-up assessments after the intervention phase, in order to see the longitudinal effect of the intervention.

G 19

27 August 2015 08:45 - 10:15

Room Brown_B7

Symposium

Social interaction in L&I

Learning across school and out-of-school contexts

Keywords: Learning in context,Out-of-school learning,Qualitative methods,Social interaction,Student learning

Sig's: SIG 10 - Social Interaction in Learning and Instruction

Chairperson: Antti Rajala, University of Helsinki, Finland

Organiser: Antti Rajala, University of Helsinki, Finland

Organiser: Sanne Akkerman, Utrecht University, Netherlands

Discussant: Sten Ludvigsen, University of Oslo, Norway

Creating continuity in learning across school and out-of-school contexts is a growing concern in educational research and practice. A claim is often made that school learning is disconnected

from student's out-of-school experiences, expertise, and motives. An implication is that students agency and identity are not adequately fostered. Not much research exists, however, about what role the continuity (and discontinuity) across contexts plays in students' learning and in the development of their identies and agency. More research is also needed about the complex and nuanced dynamics through which students' multiple learning contexts are interwoven into daily classroom interactions -- or simply ignored. The aim of this symposium is to address these questions by examining classroom interactions in three innovative learning projects in Finland, Sweden, and Norway. The four presentations share an interest in students' agency and identity, and utilize socio-cultural conceptual frameworks. First, Bronkhorst and Akkerman present a literature review about the conditions required for connecting school and other contexts beyond it, and how these connections can benefit students' learning. Second, Lantz-Anderson examines the implications of utilizing social media as part of formal language learning in secondary schools for the creation of hybrid languaging practices. Third, Kumpulainen & Rajala examine how dialogic instruction was contextualized in a third grade classroom and the consequences for students' identity building as learners of science. Fourth, Silseth, Erstad, and Gilje examine how student's interests and motives meet the demands and knowledge structures of a project on ëadvertisement' in lower secondary classrooms. Taken together the symposium considers school in relation to various other contexts in which students participate, specifically examining the ways in which learning across these contexts can show continuities and discontinuities.

At the boundary of school: Continuity and discontinuity in learning across contexts

Student learning,Social aspects of learning,Out-of-school learning,Learning in context

Larike Bronkhorst, Utrecht University, Netherlands; Sanne Akkerman, Utrecht University, Netherlands;

There is an increasing societal and theoretical recognition of the potential of connecting school learning (more) to learning beyond school. This recognition calls for an analysis of under what conditions these connections (can) take place and in what ways they can benefit studentsí learning. In this review, we synthesize the empirical literature on learning across school boundaries to reveal its current insights and unresolved issues. Departing from a boundary crossing perspective, we focus on continuity and discontinuity in studentsí learning and on ways of (re-)establishing continuity by means of boundary crossing/brokering, boundary objects and boundary interactions. Our research questions are: 1) What distinguishes school from beyond school? And 2) Under which conditions does continuity between school and beyond take place? Our findings show that first, school and beyond school cannot be maintained as dichotomous categories, as what distinguishes them is permeable in different ways and not necessarily the same for different actors. Second, we found that continuity can already be evident in existing ecologies in studentsí life; lacking when school is highly different from other practices, with severe consequences for students in making transitions; and/or potentially enriching when school and other practices can function in complementary ways; yet, in some cases, we also found that discontinuity is purposefully sought and beneficial for learning. More generally, the review points to the far-reaching challenges current schooling faces, opening up the debate on what school is (for students, teachers and other actors involved) and what it could and should be.

Embracing social media for educational linguistic activities

Qualitative methods,Student learning,Language (Foreign and second),E-learning/ Online learning,Secondary education

Annika Lantz-Andersson, University of Gothenburg, Sweden;

Communication on social media has reached such an extent that it has been argued to represent new forms of literacies. Since English has become the most common language used online, several studies put forward the learning potentials of English as second language that communicating on social media offers. This exploratory case study examines the interaction in a Facebook group, implemented as part of English learning in an international collaboration project between four school classes in secondary schools, one in Colombia, one in Finland and two in Sweden. The aim was to develop knowledge of the implications of utilizing social media as part of the specific linguistic activities of language learning, covering the practising of mundane communication. Grounded in a socio-cultural theoretical view of learning as situated, which implies studying the local practices to understand the activities, the studentsí text-based interactions in the Facebook group were logged. The results indicate that the students utilized their own linguistic communicative resources drawn from their experiences of interacting in social media out-of-school in combination with their previous knowledge of what counts as legitimate parlance in school. The social media context enabled an informal space and the linguistic interactions occasionally emerged as a hybrid between oral and writing communication. As the interactions differ considerably from communication in other educational printed formats, it needs to be viewed beyond traditional institutional language learning perspectives to reflect on evolving literacies and consider the educational value of enabling mundane language practicing in more informal spaces.

The dynamics of sense-making and identity building in dialogic classroom interactions

Video analysis,Student learning,Social aspects of learning,Social interaction,Primary education

Kristiina Kumpulainen, University of Helsinki, Finland; Antti Rajala, University of Helsinki, Finland;

Accounts of the dialogic modes of instruction are flourishing. Yet, less attention has been paid to how dialogic modes reify and are reified by the sociocultural contexts of activity. In this study, we ask what accounts as dialogic instruction in the classroom community under investigation and what this situationally framed activity counts for studentsí engagement and identity building as learners of science. This study draws on cultural-historical and discursive notions of learning and identity development. Specifically, it is guided by frame analysis that focuses on how participants organize opportunities to learn through the frames they construct in their joint social activity. The data were collected from an inquiry-learning project of an elementary classroom with eighteen third graders and their teacher. The primary data consist of video- recorded classroom dialogues. The data were analyzed with Interaction Analysis of the participantsí talk-in-interaction and significant non-verbal actions. We identified the epistemological and positional frames that were in play and traced how the studentsí engagement evolved during the

project, and how their positional identities were constructed, disrupted, or stabilized. The results illustrate how the stable and predominant categories of identity produced by conventional learning practices were disrupted in the course of dialogic instruction and how new ways of knowing, being and doing emerged as a result. The findings also highlight tensions between everyday and formal knowledge, among the studentsí social identities, and regarding the studentsí resistance against the compulsory nature of doing school.

Negotiating motives and demands in a school project on ëadvertisementí in lower secondary classrooms

Conversation/ Discourse analysis,Video analysis,Social interaction,Secondary education,Learning in context

Kenneth Silseth, University of Oslo, Norway; Oystein Gilje, University of Oslo, Norway; Ola Erstad, University of Oslo, Norway;

Within subject domains in school, different curricula themes open up for student involvement by referring to and drawing on experiences from out-of-school settings. However, how working on such themes actually benefit studentsí learning is not that clear. Our analytic approach is related to ways of studying differences and similarities between knowledge practices, and how motives and demands are defined within such practices. In this paper we explore how students participate in a school project on advertisements. Previous research has focused on advertisement as popular culture, in which critical literacy has been foregrounded. However, not many studies provide detailed analysis of how studentís interests and motives in regard to these types of activities meet the demands and knowledge structures that exist in educational practices. The analysis draws upon data from a longitudinal case study called Knowledge in Motion Across Contexts of Learning. The analysis is based on video data, interviews and 20 advertisement-movies that the students made. The findings indicate a tension in these types of projects. Students struggle in making connections between the conceptual aspect of engaging in this activity in school and the genre they are familiar with from outside of school. The motive for making an advertisement-movie seem for many students to be different from the schools demands to orient to academic genres of producing content. In the paper we discuss central issues that can illuminate the identified tensions in these types of projects.

G 20

27 August 2015 08:45 - 10:15

Room Green_A7

Symposium

Researcher education

Researchersí well-being: What is it? Does it matter? How to promote it?

Keywords: Doctoral education,Motivation and emotion,Qualitative methods,Quantitative methods,Researcher education,Social interaction

Sig's: SIG 24 - Researcher Education and Careers

Chairperson: Christelle Devos, Universite catholique de Louvain (UCL), Belgium

Organiser: Christelle Devos, Universite catholique de Louvain (UCL), Belgium

Organiser: Jenna Vekkaila, University of Helsinki, Finland

Discussant: Kirsi Pyhalto, University of Oulu; University of Helsinki , Finland

Being a researcher is all but a long quite river. Most researchers have experienced episodes of distress, impeding their achievement or leading them to leave academia (Willis & Carmichael, 2011). Yet, our current understanding of the processes related to researchers' well-being remains limited (Cotterall, 2013). Further, while some studies investigate PhD students' distress and attrition, little is known about well-being experiences at other stages of the researchers' careers (Scaffidi & Berman, 2011). In order to build new knowledge in this direction, the present symposium addresses the issue of antecedents and consequences of well-being, among PhD students, post-doctoral researchers and supervisors. Four quantitative and qualitative papers contribute to this objective, investigating well-being through complementary theoretical frameworks, for example, occupational well-being (Bakker & Demerouti, 2008; Maslach & Jackson, 1981) and academic engagement (Fredricks, Blumenfeld, & Paris, 2004). The first paper addresses the influence of supervisor support and self-presentation on PhD students' emotional exhaustion. The second paper investigates the influence of supervisor and peer support on PhD students' emotional engagement and persistence. The third paper explores post-doctoral researchers' engaging and disengaging experiences and the role of social support on these experiences. The fourth paper takes a complementary perspective and focuses on supervisors' stress and strategies for well-being. Overall, these papers demonstrate how the social interactions within academic environment and the received support are related to researchers' well-being. Finally, the symposium discusses how universities can be designed to increasingly become engaging work environments and how to foster researchers' well-being across career transitions.

PhD student emotional exhaustion: The role of supportive supervision and self-presentation behaviors

Mixed-method research,Emotion and affect,Social sciences,Doctoral education

Karen Hunter, University of Lethbridge, Canada; Kay Devine, Athabasca University, Canada;

This research examines the perceptions of international doctoral students in order to determine what influences their academic experiences and emotional well-being. Emotional exhaustion is examined in light of the use of impression management, facades of conformity, and supportive supervision. Participation in a survey designed to gather quantitative scale measures and qualitative self-observation comments was solicited in three ways: 1) through an online

community of graduate students; 2) via emails sent to graduate student associations; and 3) through snowball sampling. Overall, 331 doctoral students responded, and after data cleaning, the final sample consisted of 163 doctoral students from nine countries. Survey results indicate that supportive supervision significantly reduced emotional exhaustion among doctoral students, while the use of facades of conformity increased emotional exhaustion. Results for impression management were not significant in the quantitative analysis, but qualitative comments about its effects are included. Qualitative results indicate that doctoral students use facades of conformity due to differing values and academic goals, as well as to the desire to finish their program. Impression management is also used in order to finish the degree, as well as to avoid confrontation, and out of respect for a supervisorís role and experience. No international differences were noted, which indicates common concerns across borders. In sum, results indicate that supportive supervision and the ability for doctoral students to ìbe themselves,î or act naturally should reduce doctoral student emotional exhaustion.

How emotional well-being mediates the impact of social support on PhD studentsí planned persistence

Quantitative methods,Researcher education,Social interaction,Doctoral education,Workplace learning,Motivation and emotion

Christelle Devos, Universite catholique de Louvain (UCL), Belgium; Gentiane Boudrenghien, Universite catholique de Louvain (UCL), Belgium; Nicolas Van der Linden, Universite Libre de Bruxelles (ULB), Belgium; Benoit Galand, Universite catholique de Louvain (UCL), Belgium; Mariane Frenay, Universite catholique de Louvain (UCL), Belgium; Olivier Klein, Universite Libre de Bruxelles, Belgium;

The purpose of the present study is to investigate whether PhD studentsí emotional well-being mediates the influence of social support on their persistence in the doctoral journey. More precisely, we analyze the mediating role of PhD studentís emotional well-being and perception of progress with their work on the relationship between different types of social support (i.e. supervisor support and peer support) and their intention to persist and complete their doctoral dissertation. To this end, two questionnaires were sent to current PhD students six months apart (N = 931 in T1 and N = 676 in T2). Path analyses raised interesting results. First, the supervisorís help in structuring the studentsí work plays the most positive role, whereas neither the supervisorís relatedness nor peer support exert any influence on studentsí progress or emotional well-being. Second, emotional well-being plays an important mediating role between supervisorís support and planned persistence. This second result stresses the importance for the supervisors to pay attention to how their PhD students feel, beyond how well they are progressing with their work.

Function of social support in engaging and disengaging postdoctoral experience in natural sciences

Qualitative methods,Researcher education,Social interaction,Higher education,Workplace learning,Motivation and emotion

Jenna Vekkaila, University of Helsinki, Finland; Viivi Virtanen, University of Helsinki, Finland; Juha Taina, University of Helsinki, Finland; Kirsi Pyhalto, University of Oulu; University of Helsinki , Finland;

Postdoctoral researchers are highly accomplished group of early career researchers who have proofed themselves at the highest academic level by earning the PhD degree. The process of earning the PhD is not easy. High levels of stress and exhaustion as well as experiences of inefficacy and lack of interest have been reported among doctoral students (e.g., Vekkaila et al., 2013; Virtanen et al., 2014). However, still there is insufficient understanding of well-being among post-doctoral researchers. Even less is known about their experiences in the field of sciences (e.g., Nerad & Cerny, 1999). This study explores postdoctoral researchersí socio-psychological well-being by analyzing engaging and disengaging experiences, and the forms and the adequacy of social support in the episodes in which the experiences are embedded. Altogether, 40 postdoctoral researchers from sciences and biological and environmental sciences were interviewed. The data were collected with semi-structured interviews, and the interview data were qualitatively content analyzed. The preliminary results suggested that post-doctoral researchersí engaging experiences varied from strong dedication and deep interest in research to strengthened positive self-efficacy beliefs as a researcher. Disengaging experiences, instead, was manifested in terms of lack of professional success, sense of inefficacy, cynicism and exhaustion. Moreover, receiving both instrumental and emotional support was perceived highly significant for experienced well-being. However, postdoctoral researchers more often reported to receive support than giving it. The preliminary results indicate that various forms of social support provide significant mechanism that mediates postdoctoral researcherís engagement and disengagement.

Supervisor well-being and identity: Challenges and breakthroughs

Qualitative methods,Researcher education,Synergies between learning, teaching and research,Interdisciplinary,Doctoral education

Gina Wisker, University of Brighton, United Kingdom; Gill Robinson, Anglia Ruskin University, United Kingdom;

This research contributes knowledge about doctoral supervisor experience, identity and well-being by exploring supervisor experiences and perceptions of concerns, conflicts and stress in the supervision experience, and strategies which help supervisors manage effectively in terms of their own identity, well-being, interactions and the studentís progress. Previous research into supervision considers supervisory approaches for the development of a project and personal and research skills applicable beyond that project (Lee, 2008) power related interactions (Grant, 2008), and emotional dimensions of supervisorsí support for studentsí well-being in interactions in formalized institutional processes (Strandler et al, 2014; Johanssen et al., 2014) (Vekkaila et al., 2013), and on the research journey (Morris &Wisker, 2011). Little to date focuses on issues related to supervisor /student learning interactions and progress as this affects supervisor stress, well-being, strategies and identity. This research builds on previous work into ëdoctoral orphansí, students leaving or losing their supervisors, and supervisors who have lost or terminated their relationship with their students or gained new students from a failing

relationship (Wisker & Robinson, 2012, 2013) and work on supervisor involvement with student learning development (Wisker et al., 2010), stress and well-being.

G 21

27 August 2015 08:45 - 10:15

Room Orange_E1

Symposium

Teacher professional development

Teaching and assessment of teachersí professional knowledge

Keywords: Assessment methods and tools,Higher education,Pre-service teacher education

Sig's: SIG 11 - Teaching and Teacher Education

Chairperson: Christina Linninger, Goethe-Universitat Frankfurt, Germany

Organiser: Olga Kunina-Habenicht, Goethe University Frankfurt; Institute of Psychology, Germany

Organiser: Mareike Kunter, Goethe-Universitat Frankfurt, Germany

Discussant: Sigrid Blomeke, University of Oslo, Norway

The distinction between content knowledge (CK), pedagogical content knowledge (PCK), and pedagogical knowledge (PK) has significantly influenced the research of professional teacher knowledge (Shulman, 1986). However, empirical studies regarding CK and PCK have mainly been conducted in the domain of mathematics (Baumert et al., 2010), and research has only recently started to expand to other domains (Depaepe, Verschaffel, & Kelchtermans, 2013). Additionally, the research on PK mainly focused on the narrow conceptualization containing aspects that are closely related to instruction (Voss, Kunter, & Baumert, 2011). Thus, little is known about the role of "educational knowledge" containing theoretical or historical educational foundations that are typically taught in educational foundation courses in academic teacher education. This symposium informs about new approaches on the assessment and teaching of PCK in non-mathematical domains on the one hand and of educational knowledge on the other. In the first contribution the authors report about the construction and validation of a PCK test for biology and present correlations between CK, PCK, and PK. The second paper presents a quasi-experimental intervention approach using mixed-methods. This study evaluates the effects of an alternative training course for civics teacher education program on motivation and gains in CK and PCK. In the third contribution the construction and validation of a knowledge test measuring educational knowledge is reported, while the fourth paper investigates to which extent

educational knowledge represents a specific aspect of professional knowledge by investigating the structure of educational knowledge and correlations with general cognitive abilities.

Validation of a test instrument to measure biology teachersí professional knowledge

Psychometrics,Quantitative methods,Assessment methods and tools,Pre-service teacher education,Biology ,Higher education

Jorg Grossschedl, Leibniz Institute for Science and Mathematics Education (IPN), Germany; Daniela Mahler, Leibniz Institute for Science and Mathematics Education (IPN), Germany; Ute Harms, Leibniz Institute for Science and Mathematics Education (IPN), Germany;

Most scholars in educational sciences differentiate between three domains of teachersí professional knowledge: content knowledge (CK), pedagogical content knowledge (PCK), and pedagogical knowledge (PK). In order to gain insight into the development of these domains of knowledge in future studies, a paper-pencil test was developed to measure pre-service biology teachersí CK, PCK, and PK. In a cross-sectional study a total of 620 German pre-service biology teachers (78.6% female, average age 23.2 years) were tested by this instrument to ensure its reliability and validity. Analyses show good reliability coefficients for the three measures. Although the latent correlations between the domains of knowledge are relatively large, structural equation modelling indicates that the respective measures satisfactorily discriminate between CK, PCK, and PK. Latent regressions provide further support for their validity. Accordingly, there are coherent relationships between the three measures and (a) high school grade point average, (b) the number of semesters at university, (c) the participantsí ratings on the factual learning opportunities experienced in their previous university studies for learning central aspects of CK, PCK, and PK, (d) the type of the attended teacher training program, and (e) the second teaching subject (besides biology). The developed instrument is currently used to investigate the development of pre-service teachersí professional knowledge, to identify criteria predicting academic performance, and to reveal concrete ëopportunities to learní during university studies.

Teaching pedagogical content knowledge within a subject matter course in civics teacher education

Mixed-method research,Qualitative methods,Pre-service teacher education,Citizenship education,Higher education

Linda Ekstroem, CeSam, Sweden; Cecilia Lundholm, Stockholm University, Sweden;

Teachersí content knowledge (CK) and pedagogical content knowledge (PCK) are substantially related to studentsí learning (Hattie 2009). As previous research has stressed the meaning of learning opportunities in teacher education programs as important foundations for the development of PCK (Kleickmann et al 2013), it is important to investigate which learning opportunities within teacher education programs can support the development of these competencies. This paper presents an explorative intervention study investigating the effects of a newly developed alternative teaching strategy for a subject matter course in the civics teacher

program that is assumed to lead to increasing motivation and knowledge gains in CK and PCK. The alternative teaching strategy involved different learning opportunities (e.g. group discussion) and learning activities (e.g. identifying frequent misconceptions concerning ideologies). The research question was, whether involvement in different learning activities leads to an increased motivation and to knowledge gains in CK and in PCK. In this quasi-experimental intervention study 38 participants (22 in experimental group; 16 in control group) took part. To evaluate the effects of the intervention on motivation, CK, and PCK different outcome measures of teacher studentsí motivation, CK, and PCK were used (e.g. written take-home exams, videotaped lessons and focus group interviews). Preliminary results indicate that the experimental group did not show better performance in PCK than the control group. In contrast, initial results revealed that the alternative strategy had a positive effect on motivation. These results will be discussed regarding the development of appropriate learning opportunities in teacher education.

Construction and validation of a test for teacher candidates' educational knowledge

Psychometrics,Quantitative methods,Assessment methods and tools,Pre-service teacher education,Higher education

Olga Kunina-Habenicht, Goethe University Frankfurt; Institute of Psychology, Germany; Hendrik Lohse-Bossenz, Goethe-University Frankfurt, Germany; Mareike Kunter, Goethe-Universitat Frankfurt, Germany; Theresa Dicke, University of Duisburg-Essen, Germany;

Several researchers have developed instruments to show the practical relevance of teachersí subject-specific knowledge in teaching situations (Baumert et al., 2010). In contrast, empirical evidence for the importance of subject non-specific educational knowledge in teaching situations is scarce. We use the term ìeducational knowledgeî that extends the narrow conception of pedagogical knowledge by considering aspects as principles of school organization or historical foundations of education. To our knowledge, no research instruments measuring the full range of educational knowledge are available. In the present paper we describe the construction of a new test that assesses knowledge of relevant educational topics. Further, we investigate the empirical structure of this test, and present evidence for the validity of the test scores. The final item pool consisted of 289 items and assesses knowledge in the following six domains: learning and development; instruction; assessment; educational theory (and history); school system and educational policy; teacher profession. The test was administered to 3273 teacher candidates. This sample included 155 persons from lateral entry programs who had not attended educational foundation courses. Series of two- and three-dimensional IRT models revealed a six dimensional structure of the test that was successfully replicated using an independent second sample of teacher candidates (n=509). The reliabilities were sufficient. Comparison of test achievement between teacher candidates and lateral entry students revealed better test results for teacher candidates in most knowledge scales. Validity of the test scores and practical implications with respect to the role of educational studies in teacher education programs will be discussed.

Educational Knowledge: Exploring its factor structure and relationship with cognitive abilities

Psychometrics,Quantitative methods,Pre-service teacher education,Higher education

Theresa Dicke, University of Duisburg-Essen, Germany; Olga Kunina-Habenicht, Goethe University Frankfurt; Institute of Psychology, Germany; Kathrin Kaub, Saarland University, Germany; Sophie Wach, Saarland University, Germany; Mareike Kunter, Goethe-Universitat Frankfurt, Germany; Detlev Leutner, University Duisburg-Essen, Germany;

The distinction of teachersí professional knowledge in teachersí content knowledge, pedagogical content knowledge, and general pedagogical knowledge has been widely accepted. While research has shown the practical relevance of subject specific knowledge for teaching situations (Baumert et al., 2010), research on subject non-specific knowledge and its relation to successful teaching is scarce. In the present study we apply an extended concept of pedagogical knowledge termed ìeducational knowledgeî as a subject non-specific aspect of professional knowledge. We hypothesize educational knowledge to be knowledge specifically gained during teacher education rather than reflecting unspecific cognitive abilities. Finding evidence for this assumption is a prerequisite for any investigations tapping the role of educational knowledge for teaching behavior. If educational knowledge indeed represents a unique aspect of professional knowledge, one would expect to find low correlations between educational knowledge and cognitive abilities. To investigate a) the empirical structure of the test and b) correlations between educational knowledge and cognitive abilities, 337 pre-service teachers worked on a short version of a newly developed educational knowledge test as well as on the cognitive ability test. Results of the confirmatory factor analysis reveal a four-dimensional factor structure of educational knowledge. Further, medium to low correlations of the educational subscales with cognitive abilities provide evidence for discriminant validity of the scores in the educational knowledge test. Thus, we conclude that educational knowledge is a domain of professional knowledge and further research is needed to investigate its role for successful teacher preparation.

G 22

27 August 2015 08:45 - 10:15

Room Blue1_C1

Symposium

Social interaction in L&I

Perception of Classroom Disturbances

Keywords: At-risk students,Emotion and affect,Quantitative methods,Social aspects of learning,Social interaction,Teaching/instruction

Sig's: SIG 15 - Special Educational Needs

Chairperson: Marco Hessels, University of Geneva, Switzerland

Organiser: Boris Eckstein, Universitat Zurich, Switzerland

Organiser: Susanne Schwab, Universitat Bielefeld, Germany

Discussant: Dieter Baeyens, KU Leuven, Belgium

Classroom disturbances are considered as one of the greatest challenges in school and classroom practice (European Agency for Development in Special Needs Education, 2003). In countries with traditionally highly segregated educational systems (e.g. Germany, Switzerland, Austria), this problem has become a matter of even heightened concern, since students with special educational needs (SEN) have increasingly been integrated into the regular school system (Eckstein, Reusser, Stebler & Mandel, 2013). Especially the integration of students with social and emotional disorders is deemed quite difficult. It is still unclear, however, which aspects of behavior are the most problematic ones and cause the highest amount of disturbances as perceived by teachers and students. In his presentation, Eckstein focuses on the issue of deviant classroom behavior vs. subjective perceptions of disturbance, and presents data analyses of self-assessment and external assessment of N=11 class teachers and 245 students. Schwab thereafter centers on deviant classroom behavior in inclusive classes (N=1047 students), and shall try to answer the question as to whether classroom disturbances are predominantly caused by students with SEN. In the third presentation, Wettstein and Scherzinger analyse teacher and student perceptions of aggressive and non-aggressive behaviors, which were obtained by means of questionnaires (N=1341 students, 169 teachers), video observations (N=18 classes), and interviews (N=8 teachers, 8 peer groups). Venetz and Zurbriggen present results regarding the emotional experience of classroom disturbances from the perspective of teachers (N=38) at 500 different points in time. Finally, our discussant Petry shall recapitulate the four studies and elaborate on their implications.

Deviant classroom behaviour and perception of disturbance: First results from the SUGUS study

Quantitative methods,Teaching/instruction,At-risk students,Emotion and affect,Social aspects of learning,Primary education

Boris Eckstein, Universitat Zurich, Switzerland; Kurt Reusser, University of Zurich, Switzerland;

The current status of research on the situational genesis of classroom disturbances is still insufficiently consolidated, and the scope of the issue is difficult to assess owing to inconsistent definitions and measurement problems. This is where the SUGUS-project comes in. It examines three components of the phenomenon within an interactionist theoretical framework: (1) deviant behavior of students (ìclassroom devianceî), (2) teachersí and classmatesí subjective perception of disturbance, and (3) effects of the situational context (e.g. teaching practice). In particular, the SUGUS-study aims at reliably determining the extent of each of these components as well as their interactions. Presently, the project focuses on the two theoretical core areas pertaining to classroom deviance and perception of disturbance. For the purposes of the study, instruments for self-assessment and external assessment were developed and pretested in N = 11 fifth-grade primary school classes. The resulting data set consists of a total of 793 student-specific ratings. So far, chiefly data on deviant classroom behavior has been analyzed. First results largely

conform to theory. They show, for instance, that norms are less frequently violated as the degree of their enforcement increases. Moreover, confirmatory factor analyses revealed four latent dimensions behind the construct ìclassroom devianceî. The results point to both the reliability and the construct validity of the instruments. These findings and further procedures shall be presented and put up for discussion at the symposium.

Deviant classroom behaviour in inclusive classes: Is it just a problem of students with SEN?

Quantitative methods,Special education,At-risk students,Social aspects of learning

Susanne Schwab, Universitat Bielefeld, Germany;

Previous studies indicated that students with special educational needs (SEN) show significantly more deviant classroom behavior (e.g. aggressive behavior) than students without SEN. The goal of this study is to obtain a more detailed picture of deviant classroom behavior of students in inclusive classes and to quantify the difference between students with and without SEN. The sample consisted of 113 students with SEN and 934 students without SEN from primary (39%) and secondary (61%) classes in three federal states of Austria. Deviant classroom behavior was assessed with four subscales (moderate and severe oppositionality; moderate and severe dissociality) developed by Eckstein and Reusser (in preparation). Generally students rarely show deviant behavior in class. However, moderate oppositionality is found most often whereas severe dissociality is found least. It was further shown that oppositionality can be explained by both individual differences as well as (to a small amount) by differences at the class level. As expected, students with SEN show more severe oppositionality than those without SEN, but not more moderate oppositionality and dissociality. As deviant classroom behavior was measured with self-ratings the results should be interpreted cautiously.

Convergent and divergent perceptions of classroom disturbances

Quantitative methods,Teaching/instruction,At-risk students,Emotion and affect,Social aspects of learning

Alexander Wettstein, PHBern / University of Bern, Switzerland; Marion Schwerzinger, PH Bern, Switzerland;

Classroom disturbances strain pupils and teachers. However, different studies clearly show that teachers, pupils and external observers perceive social processes in the classroom differently (Clausen, 2002; Kunter & Baumert, 2006; Wagner, 2008). In the present study we focus on the question of how full-time teachers, part-time teachers, their pupils, and external observers perceive and interpret different forms of classroom disturbances. To which point do different observers (teacher, pupils, researchers) differ in their perceptions of classroom disturbances? Which factors contribute to the different perceptions? A questionnaire for the assessment of aggressive and non-aggressive classroom disturbances (teacher and pupils version) was developed. This questionnaire was distributed to 1341 pupils and 169 teachers. The questionnaire responses were used to identify two subgroups of classes, one subgroup with highly convergent,

and the other with highly divergent perceptions of classroom disruptions between teachers and pupils. Fixed cameras and audio systems were installed in 18 classrooms. This enabled classroom disturbances to be assessed by an external observer. Finally, interviews with 8 teachers and 8 groups of pupils were conducted in order to assess their perceptions and interpretations of the classroom disruptions.

Teachersí perceptions of classroom disturbances: Correlates and effects on emotions

Quantitative methods,Teaching/instruction,At-risk students,Emotion and affect,Social aspects of learning

Carmen Zurbriggen, University of Fribourg, Switzerland; Martin Venetz, Hochschule fur Heilpadagogik, Switzerland;

The aim of this paper is to investigate the momentary perception of teachers regarding classroom disturbances, its relationship with personal and contextual characteristics as well as the effects of perception on teachersí current affective states. Teachersí emotional reactions on disturbances ñ such as stress or anger ñ are closely linked to instruction-related beliefs and goals as well as to individualsí perception and appraisal of the current situation. Given that teachers are a high-risk occupational group, prone to increased stress and burnout, the phenomenon of classroom disturbances require additional attention. Accordingly, a review of the relevant literature reveals that classroom disturbances are among teachersí main burdens. To address the research questions, 38 primary teachers were surveyed in their natural teaching environment using the experience sampling method. They reported their momentary affective states and characteristics of instruction in 14 randomly selected teaching situations during a regular school week ñ with a total of over 500 ësubjective snapshotsí of everyday school life. The findings show that the extent of perceived classroom disturbances is, on the one hand, associated with teachersí personality traits, and on the other hand, with characteristics of instruction. Furthermore, the results indicate that situationally perceived disturbances have a negative effect on teachersí affective states ñ and this in two aspects: Perceived classroom disturbances lead to a significantly increased negative activation (e.g. stress) and at the same time to a reduced positive activation (e.g. motivation). Finally, implications for educational practice are discussed.

G 23

27 August 2015 08:45 - 10:15

Room Yellow_G2

Symposium

Higher education

Beyond the average: Investigating students' varying trajectories during their transition to HE

Keywords: Higher education,Learning approaches,Motivation and emotion,Qualitative methods,Quantitative methods

Sig's: SIG 4 - Higher Education

Chairperson: Liesje Coertjens, University of Antwerp, Belgium

Organiser: Taiga Brahm, University of St. Gallen, Switzerland

Organiser: Caroline Trautwein, University of Hamburg, Germany

Discussant: Linda Price, Open University, United Kingdom

Nowadays, more and increasingly diverse students are entering Higher Education (HE) and therefore research on the transition to HE is becoming increasingly important (Gale & Parker, 2012). Moreover, most studies look at this phenomenon through the lens of an "average student". Despite the fact that the student population entering higher education is without doubt diverse, studies examining students' varying experiences during the transition to and the first year in higher education are scarce. Moreover, further understanding of different subgroups is crucial in setting up targeted student guidance initiatives, reaching those most at risk of low performance or drop-out. To contribute to this research gap, the four studies discern different subgroups of students in their experience while transitioning to higher education. Lindblom-Yl?nne & Hailikari compare students progressing slow to those progressing fast with regard to motivational and student-related factors. Bosse & Trautwein examine differences in students' conceptions of successful studying and in their perceptions of critical requirements. The qualitative approach of the first two papers is complemented by the quantitative approach of the final two contributions. Brahm et al. rely on latent class analysis to discern subgroups of students regarding their anxiety, intrinsic motivation and self-efficacy. Last, Coertjens et al. use latent class growth analysis to detect whether students differ in their development of learning strategies during and after the transition to higher education.

Exploring university studentsí individual study paths: Why some students procrastinate and proceed?

Qualitative methods,At-risk students,Learning and developmental difficulties,Arts ,Higher education

Sari Lindblom-Ylanne, University of Helsinki, Finland; Telle Hailikari, University of Helsinki, Finland;

This study focuses on analysing individual study paths of university students. The first aim is to examine dilatory behaviour, i.e., procrastination and strategic delay, and its effects on study success during the first study year. The second aim is to compare two opposite student groups: those whose studies have proceeded very slowly, indicating procrastination, and those, whose studies have proceeded fast without problems, indicating self-regulation and organised studying. Forty-three Bachelor students volunteered to be interviewed; of these 19 had progressed slower

and 24 faster than average. Four student profiles emerged. The first three represented students who had progressed slowly and the fourth those who had proceeded fast in their studies. Procrastinators lacked self-regulation skills and had weak self-efficacy beliefs, and their study success was the lowest. Students with self-regulation problems were motivated despite their regulation problems. Strategic delayers were motivated and had strong self-efficacy beliefs, but had intentionally studied slowly. Organised students with a disposition to understand had very developed skills to organise their studying, high motivation to deeply understand their field, strong self-efficacy beliefs and the most positive experiences of their learning environment. A small group of students who belonged to this profile emphasised deadlines as important for their successful studying. The differences between the two opposite student groups, fast and slow, were evident. The results highlight the diversity of the first-year students and the complex interplay between dilatory behaviour, motivational and student-related factors that influence study success.

Student diversity as an interplay of individual factors, social background and disciplinary context

Qualitative methods,Learning and developmental difficulties,Higher education,Motivation and emotion

Elke Bosse, University of Hamburg, Germany; Caroline Trautwein, University of Hamburg, Germany;

The ëwidening participation agendaí in German higher education (HE) does not only lead to rising student numbers but also to an increased diversity among students. Up to know, it remains however unclear which sociodemographic factors (e.g. gender, educational background) and individual factors (e.g. study skills, study objectives) adequately represent student diversity and play a significant role in the transition into HE. Thus, our exploratory study aimed at identifying diversity-related factors with regard to the transition into HE, as well as their potential interplay. We interviewed 25 students differing in disciplinary and social backgrounds with regard to their conceptions of successful studying and their perceptions of critical requirements in the first year of HE. A thematic analysis revealed 14 process- vs. product-related and externally vs. internally defined criteria of successful studying and 32 content-related, personal, social and administrative critical requirements. With regard to individual factors student profiles differ in the number and the type of criteria of successful studying and critical requirements. Including sociodemographic factors into the analysis revealed differences between traditional and non-traditional students. However, our data suggest to also consider the interplay of multiple sociodemographic factors and the disciplinary study environment. Hence, we argue for a more holistic approach to student diversity. The results contribute to our understanding of ëstudentsí lived realitiesí (Gale & Parker, 2012, p. 1) and suggest that programmes, which take into consideration studentsí individual cases may be more effective than programmes which address students according to particular social background factors.

A person-centred approach to studentsí transition into Higher Education

Quantitative methods,Self-efficacy,Higher education,Motivation and emotion

Taiga Brahm, University of St. Gallen, Switzerland; Dietrich Wagner, University of St.Gallen, Switzerland; Tobias Jenert, University of St. Gallen, Switzerland;

A highly selective first study phase in many Swiss study programmes leads to a rather competitive climate among students. However, the atmosphere at the university is an important factor for studentsí transition into Higher Education. An important question in this context is whether studentsí are equiped with different dispositions influencing how they cope with this transition. Other research has already shown that different groups of students can be identified regarding their student behavior. Yet, so far little is known about patterns of variables characterizing students, transitioning successfully. The paper takes advantage of a person-centered approach, i.e. the latent-class analysis, which makes it possible to identify groups of individuals, sharing common attributes. The research was conducted as a longitudinal study during their first year at a Swiss university. The return rate was about 67%, with 820 utilizable questionnaires at t1. Based on the analysis of studentsí anxiety, intrinsic motivation and self-efficacy, three distinct classes of students could be identified. The first class can be called the ìhighly motivated and self-confidentî students. The second class is characterized by the same pattern, however, on a more intermediate level and the last class can be described as the ìleast motivated and most anxiousî group of students. This study contributes to research and theory on studentsí transition into higher education and could be a first hint that studentsí experiences of this transition can vary substantially.

Do students follow different growth trajectories in learning strategies over time?

Quantitative methods,At-risk students,Learning approaches,Higher education

Liesje Coertjens, University of Antwerp, Belgium; Vincent Donche, University of Antwerp, Belgium; Sven De Maeyer, Antwerp University, Belgium; Tine van Daal, Institute for Education and Information Sciences, Belgium; Peter Van Petegem, University of Antwerp, Belgium;

Research indicates that student characteristics at a given moment in time (e.g., upon entry to higher education) are associated with persistence in higher education. Studies focusing on different growth trajectories during the transition to higher education and on their link to drop-out are however absent. The present study investigates whether there is differential growth in learning strategies during the transition to higher education. If confirmed, it is verified whether there are different latent classes in this growth over time. The Inventory of Learning Styles-Short Version was administered at five waves spanning the period from the beginning of the last year at secondary school to the beginning of their second year at a higher education establishment. Results indicate that there is differential growth over time and that for most scales either two or three meaningful latent classes in the growth trajectory can be discerned. Further analysis will link these latent classes to student drop-out and academic success.

G 24

27 August 2015 08:45 - 10:15

Room Brown_B8

Symposium

Self-regulation

Innovative Methods of Measuring Self-Regulated Learning

Keywords: Assessment methods and tools,E-learning/ Online learning,Higher education,Meta-analysis,Self-regulation

Sig's: SIG 16 - Metacognition

Chairperson: Henrik Bellhauser, TU Darmstadt, Germany

Organiser: Henrik Bellhauser, TU Darmstadt, Germany

Discussant: Lars-Erik Malmberg, University of Oxford, United Kingdom

Self-regulated learning (SRL) has been shown to substantially contribute to academic performance in several meta-analyses (Dignath & B?ttner, 2008; Richardson, Abraham, & Bond, 2012; Sitzmann & Ely, 2011). Many theoretical models emphasize the process character of SRL (Schmitz & Wiese, 2006; Zimmerman, 2008). Traditional questionnaires are limited in their capability of measuring processes, however, the vast majority of SRL studies uses such questionnaires as measurement instruments. The aim of this symposium is to propose new and innovative methods of measuring SRL. Roth and Schmitz present the status quo of measurement instruments in SRL research by systematically reviewing the literature and quantifying the frequency of different self-report instruments. Duarte, Sim?o and Ferreira apply interview tasks and stimulated recall in their study with high school students in order to capture the multidimensionality and dynamics of SRL processes during information seeking on the Web. J?stl, Klug, Schober, and Spiel investigate the reasons for discrepancies between SRL-knowledge and action to enlighten the so far inconsistent correlations between SRL and achievement. Bellh?user and Schmitz investigate the traces of self-regulated learning in an online mathematics course and use log file analyses in order to derive parameters that can been used as nonreactive indicators of SRL. In combination, these papers represent a variety of cutting edge measurement methods that could be applied in SRL research along with or instead of conventional instruments such as questionnaires.

Measuring self-regulated learning in higher education: Aspiration and reality

Meta-analysis,Assessment methods and tools,Self-regulation,Higher education

Anne Roth, TU Darmstadt, Germany; Sabine Ogrin, Technische Universitat Darmstadt, Germany; Bernhard Schmitz, TU Darmstadt, Germany;

The growing interest in the field of learning strategies has led to an increasing number of studies and, with that, the development of numerous instruments to measure the use of self-regulated learning (SRL) strategies. Due to the complexity of this field of research, the types of assessment

methods are diverse. For this reason, we conducted a systematic review of self-report instruments that measure SRL in higher education and highlight their main characteristics. In doing so, we applied the general principles of systematic reviewing ñ we conducted a systematic search of established psychological and educational databases with previously defined inclusion criteria and applied a multistage filtering process. In an additional step, we examined a subsample of 10 established instruments in terms of their implementation characteristics, psychometric properties, and additional characteristics. The results illustrate the distribution of the self-report instruments used in higher education and point to a growing use of course or domain specific questionnaires over the past decades as well as a lack of emotional and motivational regulation scales.

Measuring self-regulated learning processes with interview tasks and stimulated recall

Case studies,Qualitative methods,Assessment methods and tools,Self-regulation,E-learning/ Online learning

Fatima Duarte, Universidade de Lisboa, Portugal; Ana Margarida Veiga Simao, Universidade de Lisboa, Portugal; Paula Costa Ferreira, University of Lisbon, Portugal; Anabela Malpique, Murdoch University, Australia;

This investigation aimed to examine how self-regulation processes occur during tasks involving information seeking on the Web. Another objective was to understand how high school students grasp opportunities to develop self-regulated learning within a Web environment and how they perceived this process. This study presents two case studies where interview tasks and stimulated recall were used to highlight the complexity involved in self-regulated learning processes and to promote the development of self-regulatory skills at a metacognitive and motivational level. Results from cluster analysis revealed how students appropriate options that allow them to make choices as they actively participate in the construction of learning and understand how self-regulated learning processes occur. Specifically, the students involved in the case studies first analyzed the task's instructions and later, regulated their decision making processes throughout the task depending on the quality and reliability of the information they retrieved from the Web. These processes involved dynamic information seeking where students went back to the Web as they found necessary in order to obtain further information or to clarify doubts so as to complete the task's demands and reach the task's defined objectives. This study contributes to the discussion of assessment tools that capture the multidimensionality and dynamics of the processes involved in the self-regulation of learning and allow for an awareness of the processes adopted.

Studentsí knowledge and application of SRL strategies in real life: ?n innovative measurement tool

Quantitative methods,Assessment methods and tools,Self-regulation,Higher education

Gregor Jostl, Universitat Wien, Austria; Julia Klug, Universitat Wien, Austria; Barbara Schober, University of Vienna, Austria; Christiane Spiel, University of Vienna, Austria;

Current SRL-research is heterogeneous and contradictory concerning correlations with achievement. One explanation could be the way we ask for SRL. To date a differentiated picture about university studentsí SRL-knowledge and their actual usage of SRL strategies is lacking. Based on this desideratum we developed an innovative measurement approach to address the following questions: (1) what do students know about the utility of SRL strategies, (2) do they apply them in real life (3) how large are the discrepancies between knowledge and action, (4) what are the reasons for the gap between knowledge and action, (5) are there differences between different courses of studies and (6) are there correlations between knowledge, action, and discrepancies on the one hand and achievement measures on the other. The adaptive measurement tool addresses declarative, procedural and conditional knowledge about SRL-strategies as well as the actual application in relevant achievement situations at university. If there are discrepancies between knowledge and action, students are asked about reasons. Additionally, achievement measures are taken. Currently the measurement tool is applied on a sample of economy and psychology students (N=400). We expect studentsí knowledge to decrease from declarative to conditional level as well as considerable discrepancies between knowledge and action. The correlations with achievement are expected to increase from declarative to conditional knowledge with the strongest correlations between the actual application of SRL-strategies and achievement. Results will be presented at the conference. With this study we contribute to explain the contradictory results about the effectiveness of SRL-strategies.

Log file analysis as objective measure of self-regulated learning in a web-based mathematics course

Experimental studies,Assessment methods and tools,Self-regulation,Mathematics,E-learning/ Online learning,Computer-assisted learning

Henrik Bellhauser, TU Darmstadt, Germany; Bernhard Schmitz, TU Darmstadt, Germany;

Research on self-regulated learning (SRL) has been conducted for more than 30 years, but the measurement of SRL is still a matter of debate. Many theoretical models view SRL as a process (Schmitz & Wiese, 2006; Zimmerman & Schunk, 2011), thereby making it implausible to rely only on traditional questionnaires as offline standards for assessment (Wirth & Leutner, 2008). However, a recent review of literature (Roth, Ogrin & Schmitz, submitted) showed that the vast majority of papers indeed used solely questionnaires as measurement instrument. Log file data seem to be a valuable approach to this problem as log files from computer supported learning environments are a nonreactive traces of learning behavior. So far, log file analysis in SRL research has mainly focused on ìartificialî learning environments that were created for research purposes, e.g. the software gStudy (Hadwin, Nesbit, Jamieson-Noel, Code, & Winne, 2007) and MetaTutor (Azevedo, Johnson, Chauncey, & Burkett, 2010). Special functionalities like goal setting and goal modification are implemented in the software so that the researcher can easily interpret the log files as traces of SRL. Log file data from ìnaturalî learning environments (e.g. Moodle) however usually only provides information about which page a person visited at which time. Whether this type of information is sufficient to infer SRL competency of the user remains an open research question. We try to target this question by analyzing the log files of N=175 prospective university students in a 4 weeks long online mathematics preparation course.

G 25

27 August 2015 08:45 - 10:15

Room Blue2_D1

Symposium

Mathematics education

Scaffolding in Mathematics and Science Education

Keywords: Mathematics,Science education,Social interaction

Sig's: SIG 10 - Social Interaction in Learning and Instruction

Chairperson: Christine Pauli, University of Fribourg, Switzerland

Organiser: Jantien Smit, Saxion University of Applied Sciences, Netherlands

Organiser: Martine Gijsel, Saxion, Netherlands

Discussant: Gabriele Kaiser, University of Hamburg, Germany

In educational studies scaffolding is typically used as a concept for analyzing and promoting responsive support by a more knowledgeable other aimed at learners' independence. The aim of this symposium is to expand our knowledge about how to promote and measure scaffolding in mathematics and science education. In the first presentation Wischgoll and colleagues report on how scaffolding can be captured through alignment between activation by the tutor and tutee's activity in secondary education, especially while dealing with impasses and errors. Subsequently, Pfister and colleagues report on an intervention study to stimulate adaptive teaching practices through scaffolding in mathematics lessons in inclusive primary classrooms. Kazak and Wegerif, thirdly, explore the relationship between scaffolding and dialogue using data from a design-based research study into the development of understanding of probability in upper primary students. Smit and Gijsel, finally, present a case study in which scaffolding is employed so as to shape and trace in-service primary science teachers' professional development with respect to the design of language-oriented science lessons. The scientific significance of this symposium lies in showing how the idea of scaffolding is made productive with pupils and teachers, using a variety of methodological approaches. By bringing these studies together this symposium shows the scope and potential of the scaffolding concept, and provides a richer picture than is possible in a single study. The educational relevance concerns insights into how adaptivity to learners' and teachers' needs can contribute to the quality of mathematics and science education.

Scaffolding: Alignment between activation by the tutor and tutee/s activity in dealing with impasse

Qualitative methods,Teaching/instruction,Social interaction,Mathematics,Secondary education,Learning in context

Anke Wischgoll, University of Freiburg, Germany; Christine Pauli, University of Fribourg, Switzerland; Kurt Reusser, University of Zurich, Switzerland;

In mathematics instruction, individual learning support plays an increasingly important role, owing to the heterogeneity of studentsí learning prerequisites. Scaffolding represents an attractive concept of productive support. Clarification is still required regarding the question of what constitutes effective scaffolding in dealing with impasses and errors. The current investigation pursues this question using video analyses of 26 tutoring situations with high school students (8th/9th grade), in which teachers each supported one student in solving an algebraic word problem. Based on tutee/s success in independently solving a transfer task upon completion of the tutoring situation, a distinction was made between successful and unsuccessful tutoring situations. The analyses are based on a qualitatively oriented multi-methods approach. Starting from a task analysis, the analyses of tutor-tutee interaction focused on the alignment between activation by the tutor, i.e. teacher support, and tutee/s activity, i.e. student/s participation on solving the task, when impasses, i.e. pre-stages of errors, and errors occurred and responsive fading in the following segment. Thus, we capture scaffolding as alignment between activation by the tutor and tutee/s activity and subsequent fading that is finely tuned to the tutee/s current level of understanding. Our results indicate the importance of tackling all impasses and errors. In successful tutoring situations we found alignment between activation by the tutor and tutee/s activity, and tutor/s responsive fading attuned to tutee/s activity once the impasse or error was resolved.

Stimulating adaptive teaching practices through scaffolding in inclusive mathematics classrooms

Video analysis,Teaching/instruction,Social interaction,Mathematics,Primary education,Learning in context

Mirjam Pfister, University of Zurich, Switzerland; Elisabeth Moser Opitz, University of Zurich , Switzerland; Christine Pauli, University of Fribourg, Switzerland;

Meeting the needs of heterogeneous groups of pupils is challenging, and adaptive teaching practices are claimed to be important. This applies especially for inclusive classrooms and for low achievers. A video study of 34 inclusive classes (3rd grade, aged 9 years) was conducted to examine how teachers implement a remedial mathematics program in classroom setting, focusing on adaptive teaching practices and scaffolding means (e.g. giving hints, modeling, explaining). To examine the teachersí adaptive teaching practices, a high inferent rating system was developed, based on instructional components and strategies for low achievers in mathematics (e.g. cueing, modeling, verbal rehearsal, explicit instruction, use of manipulatives), and the concept of scaffolding. The rating system comprises the dimensions cognitive activation, stimulation of discourse, use of manipulatives, target orientation and dealing with mistakes. The results show that 54% of the teachers reached a high level of adaptivity, particularly regarding the dimensions use of manipulatives and target orientation. In terms of the dimensions

stimulation of discourse, cognitive activation and dealing with mistakes, for which there were less concrete hints in the intervention material, the teachers achieved lower values. To sum up, the study shows that it is possible to stimulate adaptive teaching practices through scaffolding in inclusive classrooms. However, the diverse results for the different dimensions imply that scaffolding and adaptive teaching in classroom situations are competences that cannot (only) be adopted from a ìprogramî. To develop these competences, more intensive training seems to be necessary.

Combining scaffolding for content and scaffolding for dialogue to support conceptual breakthroughs

Conversation/ Discourse analysis,Qualitative methods,Teaching/instruction,Social interaction,Mathematics,Primary education

Rupert Wegerif, University of Exeter, United Kingdom; Sibel Kazak, University of Pamukkale , Turkey; Taro Fujita, University of Exeter, United Kingdom;

In this talk, we explore the relationship between scaffolding, dialogue and learning new concepts using data from a design-based research study into the development of understanding of probability in 10-12 year old students. Our aim in the study is to combine the scaffolding of content using technology with scaffolding for dialogue and to explore the causal processes linking these kidns of scaffolding to conceptual breakthroughs. The dialogue scaffolding promoted both dialogue moves specific to the context of probability and dialogue in itself (dialogic). We analyse video-recordings and transcripts of pairs and triads talking together around TinkerPlots software with worksheets and teacher interventions, focusing on moments of conceptual breakthrough. We found that combining scaffolding for content with scaffolding for dialogue was effective in stimulating conceptual insights into aspects of probability. This constructive combination of scaffolding and educational dialogue develops educational theory in showing how dialogic education, often discussed as a way of learning general and transferable skills and dispositions, can be framed and focused to generate learning within a specific domain area.

Scaffolding teachers in designing language-oriented science lessons: A case study

Case studies,Design based research,In-service teacher education,Science education,Primary education,Inquiry learning

Jantien Smit, Saxion University of Applied Sciences, Netherlands; Martine Gijsel, Saxion, Netherlands;

One way to promote science in primary education is to integrate it with the key school subject of language. In the project reported here we used our own design knowledge and experience to professionalize in-service primary teachers in designing language-oriented science lessons. To this end we employed the idea of scaffolding, which entails diagnosis, responsiveness and handover to independence over time. The aim of this paper is to show how such long-term scaffolding by researchers of in-service teachers can be realized, both in shaping the intervention

(5 sessions of 2.5 hours each) and in tracing two case study teachersí learning processes. Data collection included researcher-written scaffolding logs and two interviews with the teachers both during and after the programme (transcribed verbatim). The scaffolding logs, containing diagnoses as well as intentions as to how to be responsive, served to shape the intervention according to the idea of scaffolding. To trace teachersí increased independence in designing the researchers independently analyzed the interview transcripts on teacher-reported learning outcomes in four categories of teacher learning activities (e.g., reflection), as well as researcher-derived learning. The analysis of learning outcomes points out that teacher learning related to the design of language-oriented science lessons took place, thus confirming handover to independence. The significance of this study is twofold: It extends the scaffolding concept to include professional development, and it deepens our understanding of how language-oriented science teaching can be promoted in primary classrooms.

G 26

27 August 2015 08:45 - 10:15

Room Blue2_D2

Symposium

Cognitive development

Mathematics anxiety: from gender differences to the cognitive impact of anxiety

Keywords: Cognitive development,Emotion and cognition,Learning and developmental difficulties,Mathematics,Numeracy

Sig's: SIG 8 - Motivation and Emotion

Chairperson: Denes Szucs, University of Cambridge, United Kingdom

Organiser: Denes Szucs, University of Cambridge, United Kingdom

Discussant: Ernest Van Lieshout, VU Univeristy Amsterdam, Netherlands

Besides cognitive difficulties with mathematics a substantial number of children and adults have mathematics anxiety (MA), a debilitating emotional reaction to mathematics. the symposium will provide a lively picture on how emotional, cognitive and gender factors interact already from the earliest levels of primary school education. Szucs will rely on a large scale study and focus on the important question of whether girls report higher levels of MA in primary school than boys controlling for test and trait anxiety and whether MA was related to mathematics performance. Bieg further investigates gender differences in MA by focusing on differences between state and trait anxiety. In addition, they also studied self-concept beliefs and stereotypes related to mathematics learning. This presentation will provide further refined understanding of why gender differences may be measured in MA. Besides gender differences another important are in

MA research regards how anxiety impacts on working memory processes. Morsanyi et al. investigated this question by comparing MA and its impact in low and high working memory individuals in various experimental conditions with different levels of perceived threat to mathematics abilities. The presentation will highlight how the interaction of a particular emotional context (perceived threat levels) and cognitive factors result in the appearance of MA. Mammarella further investigates the question of how working memory capacity interacts in MA. They studied visual and verbal short-term and working memory. They demonstrated that different memory systems are differently affected in MA which has important implications for potential intervention methods.

Gender differences in mathematics anxiety in primary school controlling for trait and test anxiety

Attitudes and beliefs,Cognitive development,Cognitive skills,Developmental processes,Emotion and cognition,Learning and developmental difficulties

Denes Szucs, University of Cambridge, United Kingdom;

Mathematics anxiety (MA) is a state of discomfort caused by performing mathematical tasks. Here, in a large group of primary school children (N=849) we investigated whether girls show higher levels of MA and trait anxiety than boys and whether the relation between MA and mathematics performance is significant when controlling for trait anxiety and test anxiety. By using bootstraping statistics we found that all anxiety scores were significantly higher in girls than in boys while their math and reading performance did not differ. Simultaneous regressions showed that our General anxiety measure and MA negatively predicted mathematics scores. Our results suggest that MA is a standalone construct, different from trait anxiety and should be studied independently. Our data warrants specific targeted interventions for math anxiety already in primary school.

Gender differences in math anxiety: The role of self-concept and belief in gender stereotype

Developmental processes,Emotion and cognition,Numeracy,Mathematics

Madeleine Bieg, University of Konstanz, Germany;

Anxiety is negatively related to well-being and learning outcomes in students, with girls being particularly likely to suffer from anxiety in the domain of mathematics. The present diary study (N = 628) aimed to replicate and extend recent research (Goetz, Bieg, Ludtke, Pekrun, & Hall, 2013) in investigating whether gender differences in trait (habitual) versus state (momentary) mathematics anxiety were moderated by self-concept beliefs and gender stereotypes. As expected, female students reported higher trait math anxiety but no gender differences were found in state anxiety, with the discrepant findings for trait versus state anxiety accounted for by studentsí self-concept beliefs. Furthermore, endorsement of the gender stereotype that mathematics is a male domain explained additional variance in the trait-state discrepancy for female students. In summary, female students with a low self-concept in mathematics or who reported the gender stereotype tended to overestimate their trait mathematics anxiety as

compared to their actual anxiety during mathematics instruction. Implications for future research and educational practice are discussed.

Mathematical reasoning under pressure: The role of working memory capacity

Cognitive development,Developmental processes,Emotion and cognition,Learning and developmental difficulties

Kinga Morsanyi, Queen's University Belfast, United Kingdom;

Performing badly in maths in important test situations can be an obstacle for students to enter STEM professions. Thus, it is important to understand why some students might underperform when pressure is high. The current study investigated the effects of performance pressure on probabilistic reasoning performance, while taking into account studentsí working memory capacity. The results showed that under pressure, participantsí performance declined as compared to a neutral control condition. Specifically, participants with low working memory capacity performed particularly badly under threat. These results have important educational implications, as they show that stressful test situations can lead to underperformance in students with lower working memory capacity. This, in turn, could lead to an underestimation of their true potential in maths, and could prevent them from entering STEM professions.

Math anxiety and developmental dyscalculia: A study on working memory processes

Cognitive development,Developmental processes,Emotion and cognition,Learning and developmental difficulties,Learning disabilities

Irene C. Mammarella, University of Padova, Italy;

The main objective of this research is to analyze verbal and visuospatial short-term memory (STM) and working memory (WM) performances in children with developmental dyscalculia (DD) and high mathematical anxiety (HMA) compared with typically developing (TD). Groups were matched on reading comprehension performance and IQ as well as on general (non-mathematical) anxiety levels. In other words, we aimed to disentangle the differences between a low arithmetic proficiency due to a specific math difficulty and a low math performance due to emotional aspects, such as math anxiety and to test whether children with DD and HMA are differently impaired in verbal and visuospatial STM and WM. Children were individually tested with four computerized tasks: two short term memory tasks (forward verbal and visuospatial recall) and two working memory tasks (backward verbal and visuospatial recall). Relative to TD children, our results confirmed previous studies showing that children with DD were more impaired in visuospatial than in verbal WM tasks (e.g., Passolunghi, & Mammarella, 2010; Szucs, et al. 2013). Children with DD did not show impairments on the forward or backward verbal tasks, but showed specific impairments in the visuospatial WM task. In contrast, children with HMA were particularly impaired in the verbal WM task. Overall, our results have both clinical and educational implications: showing that childrenís difficulties in mathematics are related with different WM strengths and weaknesses and both educators and teachers should be aware of them.

G 27

27 August 2015 08:45 - 10:15

Room Yellow_G4

Symposium

Self-regulation

Potential and challenges of ICT-based learning environments for research on self-regulated learning

Keywords: Computer-assisted learning,Learning analytics,Metacognition,Mixed-method research,Multimedia learning,Self-regulation

Sig's: SIG 7 - Learning and Instruction with Computers

Chairperson: Susanne Narciss, Technische Universitat Dresden, Germany

Organiser: Susanne Narciss, Technische Universitat Dresden, Germany

Organiser: Roger Azevedo, North Carolina State University, United States

Discussant: Roger Azevedo, North Carolina State University, United States

In the last decades several research groups have developed complex technology-enhanced learning environÆments (TEL-E) and used them to investigate self-regulated learning (SRL). Winne has developed nStudy, a web-application that offers a wide range of SRL-features and logs students' operations on these features with fine-grained time-stamps. Kramarski and her team have developed the web-based IMPROVE system rooted in an integrated (Technology Pedagogical Content Knowledge =) TPCK-SRL model and used it in intervention studies with teacher education students. Narciss and colleagues have used Study Desks, web-based learning environments generated with integrated SRL-tools, to investigate how and with what impact students use the SRL-tools. Maria-Angeles Serrano and her colleagues have developed Read&Learn a web-based application to study reader's self-regulation when performing task-oriented reading activities. This symposiums aims at comparing these four TEL-E in order to (a) identify their similarities and distinct features, (b) discuss the potential and challenges related to these features for research in the field of SRL and metacognition, (c) share the lessons learned with using the TEL-E in the studies on SRL, and (d) to discuss the theoretical, methodological and practical implications that can be derived from these lessons learned for further research and instructional design. Roger Azevedo who has also developed a complex TEL-E (Meta-Tutor) and used in studies on SRL and metacognitive processes will discuss the contributions.

nStudy: A tool for gathering and conveying learning analytics about studying

Learning analytics, Educational technology,Self-regulation,E-learning/ Online learning,Multimedia learning

Philip Winne, Simon Fraser University, Canada;

A significant bottleneck for learning science is gathering fine-grained, extensive and time-stamped data that fully trace how learners operate on information they study and which information is the object of which operation. nStudy is a web application that opens this bottleneck. Learners use nStudyís features as they study html or pdf content online. Every operation applied to each bit of information is unobtrusively logged. Modern learning analytics provide methods for analyzing these trace data to better understand how learners go about learning and generates reports that can be fed back to learners to support their self-regulated learning. This presentation describes/demonstrates (if network connections permit) nStudy, overviews learning analytic methods and reports for instructors and learners, and discusses uses of nStudy in learning science.

TPCK-SRL model: Prompting teachers to integrate SRL and technology Pedagogical Content Knowledge

Mixed-method research,Educational technology,Teacher professional development,Self-regulation,E-learning/ Online learning,Multimedia learning

Bracha Kramarski, Bar-Ilan University, Israel;

A practical application for teachers practice self-regulated learning (SRL) as learners and as teachers in constructing their Technology Pedagogical Content Knowledge (termed TPCK) is presented by a unique TPCK-SRL model. The integrated TPCK-SRL model in Web-Based Learning with IMPROVE self-questions prompts aims to encourage teachers to be proactive and SRL in analyzing/designing lessons and decision making. The model used four categories of question prompts: comprehension, connection, strategy, and reflection throughout the three cyclical SRL phases of the solution process (planning, monitoring and evaluation). It allows access to different resources, forum participation, feedback exchanges and offering log-traces on the solution process. Overall, research has lent support to the combined model as a catalyst that fosters teachers to integrate SRL into TPCK. The presentation will elaborate on the model, present major empirical findings and conclusions referencing to types of prompts tested in the model (i.e., direct vs. indirect), timing (planning/monitoring/evaluation phases) and their impact on teachers combined ability TPCK-SRL as manifested in their discussions and transfer to real time teaching. Theoretical, methodological (as log-trace assessment), practical contribution and challenges for teachers and students will be discussed.

Investigating self-regulated web-based learning with Study Desks: Lessons learned

Mixed-method research,Educational technology,Metacognition,Self-regulation,E-learning/ Online learning,Multimedia learning

Susanne Narciss, Technische Universitat Dresden, Germany; Hermann Koerndle, Technische Universitat Dresden, Germany; Antje Proske, TU Dresden, Germany;

In the Study2000-project we developed, implemented, and evaluated generic authoring tools to facilitate the design of and research with Web-based Learning Environments (Web-LEs; see http://studierplatz2000.tu-dresden.de). These tools offer facilities for creating a common basis of Web-based learning resources which help (a) to communicate and share knowledge and information among all participants of a Web-based learning scenario, (b) to regulate individual and group activities, (c) to trace these activities and (d) to represent the processes and products resulting from these activities. These tools include the Exercise-Format-Editor (EF-Editor), the Study-to-Web Compiler (s2w-compiler), and TEE-machine. We call a web-based learning environment designed with these authoring tools Study Desk (i.e. a technology-enhanced working space for learning and studying). The purposes of this contribution are to (a) describe the main features of a Study Desk and outline how they are rooted in the underlying SRL-framework, (b) illustrate by selected studies that have been conducted with Study Desks the types and methods of data collected, and (c) discuss the lessons learned and their implications for further research.

Read&Learn: A tool for the study of self-regulation in task-oriented reading activities

Mixed-method research,Student learning,Comprehension of text and graphics,Self-regulation,Science education

Maria-Angeles Serrano, University of Valencia / Interdisciplinary Research Structure for Reading Research (ERI Lectura), Spain; Eduardo Vidal-Abarca, Universidad de Valencia, Spain; Ramiro Gilabert, Universidad de Valencia, Spain; Laura Gil Pelluch, University of Valencia, Spain; Amelia Mana, Universidad Valencia, Spain; Antonio Ferrer, Universidad Valencia, Spain; Vicenta Avila, Universidad Valencia, Spain; Ana Cristina Llorens, Universidad Valencia, Spain; Raquel Cerdan, Faculty of Psychology. University of Valencia, Spain;

We present an application to study readerís self-regulation when performing task-oriented reading activities. In a task-oriented reading situation the reader forms a task model which enables him or her to engage in a series of decisions and activities that terminate when the task is considered finished. Read&Learn (R&L) has been developed to study the readerís self-regulation in these situations. This application allows presenting texts and different kinds of tasks, providing specific feedback according to different variables, as well as offering hints and prompts to the learner. All these elements can be delivered in different modalities. R&L automatically records readersí interaction with the system and generates a large number of indexes. All these possibilities allow testing the effect of different procedures for teaching and learning elements. We illustrate these possibilities with some studies conducted so far, including TuinLEC, an Intelligent Tutoring System designed by R&L technology. Finally, we point out the potential and constraints of using the system for research in task-oriented reading situations.

G 28

27 August 2015 08:45 - 10:15

Room Green_A8

Symposium

Collaborative and cooperative learning

Collaborative regulation and dialogue in primary classrooms: integrating analytical perspectives

Keywords: Argumentation,Cooperative/collaborative learning,Metacognition

Sig's: SIG 16 - Metacognition

Chairperson: Valeska Grau, Pontificia Universidad Catolica de Chile, Chile

Organiser: Valeska Grau, Pontificia Universidad Catolica de Chile, Chile

Organiser: David Whitebread, University of Cambridge, United Kingdom

Discussant: Marja Vauras, University of Turku, Finland

Peer-mediated learning has had an important role when investigating learning in the classroom. Within this frame, there has been a growing emphasis on fostering collaborative group-work within educational systems across the world. Despite the documented effectiveness of group-work intervention programs we still lack clarity on which are the elements characterising good quality peer interaction to promote learning or which are the main collaborative skills we need to foster in our students. Methodologically, there are many approaches to analyse group work but there is a need to develop unitary frameworks that enable the integration of previous evidence of quality of collaboration such as dialogue, argumentation, metacognitive and regulatory skills, socioemotional skills and engagement. In this symposium, we present 4 papers aiming to carry out research on collaborative group-work interactions in primary classrooms and developing integrative frameworks of analysis. Hence, the objective of the symposium is to advance in the study of the individual and social nature of collaboration in the classroom, with a special emphasis in self and shared regulatory processes and dialogue and the way in which they relate to the promotion of school learning.

Playful collaborative groups that support metacognitive abilities, creativity and narrative skills

Video analysis,Metacognition,Self-regulation,Primary education,Cooperative/collaborative learning

David Whitebread, University of Cambridge, United Kingdom; Marisol Basilio, University of Cambridge, United Kingdom; Pablo Torres, University of cambridge, United Kingdom; Mee Kyoung Kim, University of Cambridge, United Kingdom;

Recent research has established a number of characteristics of successful collaborative groupwork. These include the presence of socially shared regulation, (Hadwin & Oshige (2011); Iiskala et al., 2011), the presence of ëexploratory talkí aimed at co-constructing shared understanding (Mercer & Littleton, 2007), regulatory talk which is concerned with the fundamental goals of the task (Grau & Whitebread, 2012), and a balanced pattern during the task of relative contributions or ëpositionsí adopted by group members (van Langenhove & Harre, 1999). This paper reports an analysis of these various group dynamics and processes within a study of the narrative skills of 108 1st, 3rd and 5th grade students in UK primary classrooms. In previous studies, the impact of playful group problem-solving activities (Whitebread et al., 2007), and a ëguided playí approach (Hirsh-Pasek, Golinkoff, Berk & Singer, 2009) on language and metacognitive skills, which underpin narrative abilities, has been clearly established. The participants in the present study worked in mixed ability groups of three and engaged, over one academic year, in 12 episodes of pretence and constructional play involving LEGO©, used to stimulate the generation of different genres of writing. In addition to the above characteristics of group processes, the verbal and non-verbal behaviours evidenced during these playful group tasks were analysed in relation to their playfulness, metacognitive strategies and generation of creative ideas, and to individual childrenís progress in metacognitive abilities, creativity and narrative skills.

Collaborative learning skills in Chilean primary students: Shared regulation and dialogue

Metacognition,Peer interaction,Primary education,Cooperative/collaborative learning

Valeska Grau, Pontificia Universidad Catolica de Chile, Chile; Amaya Lorca, Pontificia Universidad Catolica de Chile, Chile; Carolina Araya, Pontificia Universidad Catolica de Chile, Chile;

Collaboration is a necessary skill across educational settings and in the workforce. Therefore there has been a growing emphasis on fostering collaborative competences within educational curriculum across the world. Indeed, PISA will include the assessment of collaborative competences in 2015. Although there is increasing evidence of positive impact of collaborative group-work on studentsí learning, social relationships and engagement in school, mechanisms through which these benefits are accomplished are still unclear. Moreover, little is known about the skills children need to successfully collaborate with classmates on classroom activities. The present study aims to characterise patterns of interaction and collaboration skills of Chilean primary school students. 158 groups of 3 students each from 47 different schools were video-recorded carrying out a problem solving activity. 80 groups were from 3rd grade and 78 from 7th grade across the participant schools. The schools were sampled by SES (high, middle, low). The data analysis followed the guidelines of sociocultural discourse analysis (Mercer, 2004). Therefore, relevant episodes of talk were selected (ie. Disputational, cumulative, exploratory) and within those episodes specific utterances reflecting self-regulatory and communication and argumentation skills were identified. Also, indicators of engagement and social positioning were registered. Results show that there is a clear improvement in the quality of dialogue and interaction from 3rd to 7th grade. Also, the main differences among groups were explained by school SES especially in relation to communication and argumentation skills but not in relation to regulatory skills or social positioning. Implications for theory and practice are discussed.

Interpersonal regulation of learning in primary classrooms: Dialogue and group positioning

Metacognition,Self-regulation,Social interaction,Primary education,Cooperative/collaborative learning

Deborah Pino-Pasternak, Murdoch University, Australia; David Whitebread, University of Cambridge, United Kingdom; Dave Neale, University of Cambridge, United Kingdom;

This qualitative study explored the interactions of 4 triads of year 1 students in the UK (n=12, mean age= 67 months, 6 female) while engaged in problem-solving activities, investigating in particular the temporal flow of and interconnections between dialogic practices, positions adopted by group members (degree of activity ownership), and evidence of interpersonal regulation of learning. Group activity was captured through video (Total footage = 40 hours) and subjected to three layers of qualitative analysis, undertaken by 3 researchers: (1) Comprehensive qualitative descriptions of group activity; (2) Identification of significant episodes in group functioning (e.g. shifts in positions, shifts in regulation of learning and group functioning, emergence of exploratory forms of dialogue); (3) multidimensional analysis of significant episodes with a focus on dialogue, regulation and positioning. The findings show that the groups engaged to a different degree in productive (task oriented) interactions. These interactions were characterised by: (a) whole group focus on task goal or understanding and use of exploratory dialogue (e.g.: asking questions and volunteering reasons); (b) positive social dynamics marked by playful initiatives, uptake of contributions, and use of persuasive language in the event of disagreements, and (c) balanced contribution between members facilitated through shared (joint) regulation or distributed forms of regulation where all members took turns in taking leading positions throughout the activity. Different ìownershipî preferences were identified among the most able students who assumed a leading role particularly during the first activities.

The effect of peer group argumentation on learning: Looking for the missing link

Argumentation,Metacognition,Self-regulation,Primary education,Cooperative/collaborative learning

Antonia Larrain, Universidad Alberto Hurtado, Chile; Paulina Freire, Universidad Alberto Hurtado, Chile; Patricia Lopez, Universidad Alberto Hurtado, Chile; Valeska Grau, Pontificia Universidad Catolica de Chile, Chile;

There are good theoretical reasons to think that peer group argumentation facilitates learning. Coherently, there is some strong evidence supporting this belief. Interventions, led both by researchers (Howe, Rodgers, & Tolmie, 1990; Howe, Tolmie, & Rodgers, 1992; Howe & Tolmie, 2003) and teachers (Howe, et al., 2007) confirm the delayed effects of discussion on studentsí conceptual development. This suggests that peer group argumentation may have an impact on cognitive and/or meta-cognitive development which in turn fosters learning (Howe, McWilliam & Cross, 2005; Howe, 2009). However, still we do not know whether these learning effects are related to the fostering of meta-cognitive activity or self-regulation improvement. In order to explore the mediational effect, we conducted a small quasi-experimental study. Two

teachers and 4th grade classrooms (aged 9-10 years) and 61 students participated in the study (39 female). One teacher was invited to teach a thematic unit (force and movement) with lesson plans specially developed to foster argumentation in the classroom (intervention group). All the students were evaluated individually one time before and two times after the lessons (immediate and differed post evaluations) in order to measure their written and oral level of science learning and argumentative skills, and their oral level of self-regulation. All small group work activity was videotaped and analysed. Longitudinal analyses of selected cases were conducted. Results show that peer group argumentative interactions are systematically related to learning gains, and, more interesting, that this relation is mediated by argumentative and self-regulation skills.

G 29

27 August 2015 08:45 - 10:15

Room Yellow_G1

Symposium

Motivation

Future Time Perspective and Career aspirations: A session in remembrance of Willy Lens.

Keywords: Achievement,Motivation and emotion,Quantitative methods

Sig's: SIG 8 - Motivation and Emotion

Chairperson: Jenefer Husman, Arizona State University, United States

Organiser: Jenefer Husman, Arizona State University, United States

Discussant: Maarten Vansteenkiste, Ghent University, Belgium

Willy Lens examined the influence of the multiple dimensions of Future Time Perspective on motivation for almost 40 years. Future Time Perspective Theory examines the relationship between a persons' conception of their future and their perceived paths to achieving that future, and their motivation, behavior, and self-regulation. His research team examined relationships between FTP and academic achievement, work performance; self-determination theory; goal orientation; adaptive life behaviors; and teacher burnout. His work and the work of his students and colleagues, provided evidence that FTP is a critical motivational construct, one which impacts all areas of life. In this symposium we seek to honor his work and add to the knowledge base concerning FTP. Specifically this set of papers will examine the influence of FTP on motivation, emotions, and self-regulation in the context of adolescences' and emerging adults' career aspirations and decisions. The set of papers will demonstrate the implications of FTP on young people's career explorations, and the effect of those career explorations on their motivation and self-regulation. The four papers provide examples of the varied aspects of FTP

and the various methods for assessing FTP. Together this set of papers not only provides detailed exploration of the influence planning has on adolescents and young adults it also demonstrates that the foundation laid by Willy Lens remains a fruitful source for understanding motivation and a valuable source for practice.

Future Time Perspective, employability and satisfaction with life of last year university students

Qualitative methods,Student learning,Self-regulation,Higher education

Dora Herrera, Pontificia Universidad Catolica del Peru, Peru; Lennia Matos, Pontificia Universidad Catolica del Peru , Peru; Rocio Encarnacion Melo, Pontificia Universidad Catolica del Peru, Peru;

In this study the positive relationship between Future Time Perspective, employability and Life Satisfaction in young adults is expected. One-hundred and twenty nine (64 boys and 65 girls) participants from the three degrees with the largest number of students collaborated and were assessed: Psychology (n=50); Economy (n=30) and Industrial Engineering (n=49). Participantsí ages ranged between 19 and 35 years (M= 22.81, DE=2.12). The instruments for FTP, Employability and Life Satisfaction were, respectively, the Future Time Perspective-R (Herrera, Martinez, Lens, 2010); the sub-scale of Employability (De Cuyper & De Witte, 2008) which was adapted to Peru (Alarco, 2010) and the Satisfaction with Life ScaleñSWL (Diener, Emmons, Larsen &Griffin, 1985) which was also validated in Peru (Valenzuela, 2005; Navarro, 2013). Results have shown that differences in FTP content categories and length appear among the three careers. Psychology last year students have a shorter FTP (40.1%) than the ones from economy (31.9 %) and industrial engineering (23.1%) who have the longest FTP (49.9%). Findings also indicated that long FTP and external employability correlates negatively (r=-0.30, p.01) but the association between this external employability and life satisfaction is positive (r=0.31, p.001). Among the predictor variables; long FTP accounted for 73% of the variance in external employability.

Development of early adolescentsí future time perspectives, self-regulated learning, and achievement

Quantitative methods,Student learning,Self-regulation,Secondary education

Thea Peetsma, University of Amsterdam, Netherlands; Jaap Schuitema, University of Amsterdam, Netherlands; Ineke van der Veen, University of Amsterdam, Netherlands;

Developments in early adolescentsí FTP have been found to predict a decrease in school motivation in the first years of secondary education. That is why a study of the developments of early adolescentsí time perspectives, their self-regulation of learning and achievement at school can be interesting in an apparently problematic period for adolescentsí learning motivation: Well-known is the decrease of school motivation from the start of secondary education in different countries. Does self-regulation mediate the relation between FTP and academic achievement? The results indicate that relations between FTP on a school and professional career

and self-regulation are all positive: Stronger relation for school and professional career with identified and internal regulation and a bit less with introjected regulation. The initial level and the growth of the FTP on school and professional career is positively related to academic achievement. However, we find only partly mediation of the relationships between FTP and achievement by different stadia of regulation.

Future Time Perspective: A key factor of studentsí perceived utility of their technical education

Quantitative methods,Student learning,Higher education,Vocational education,Motivation and emotion

Annie Dubeau , University of Quebec, Canada; Mariane Frenay, Universite catholique de Louvain (UCL), Belgium;

Coursesí utility perception is a fundamental aspect in the lives of students enrolled in career programs. However, the relationship between perceived utility and student achievement-related outcomes is observed only when students adopt a positive attitude toward their future. This paper presents the results of two studies. The first study aims to validate a French version of the Future Time Perspective Student Questionnaire (Husman & Shell, 2008), with four subscales measuring future time perspective (connectedness, value, extension, and speed). Data were obtained from 693 of French-speaking pre-university and technical college students. Psychometric properties of this French version will be presented along with analysis to validate the internal consistency of its included subscales and its internal structure (confirmatory factor analysis and path analysis). The second study examines the respective role of future time perspective and classroom perceptions on studentsí perceived utility of their career programs, using path analysis. Hypotheses were tested on a sample of 506 technical college students. We test a theoretical model of the relationship between two sets of determinants (FTP and classroom perceptions) of the perceived utility. Results of the path analysis revealed that the theoretical model showed a good fit to the data.

When performance really matters: Future Time Perspective and career aspirations

Qualitative methods,Student learning,Engineering,Higher education,Motivation and emotion

Jenefer Husman, Arizona State University, United States; Katherine Cheng, Arizona State University, United States;

We posit that undergraduate studentsí perceptions of instrumentality, in the context of a course related to their career aspirations, can predict their positive emotions and cortisol levels in the classroom context. Consequently, we aim to emphasize the importance of research in future oriented motivation, as they may shed light to post-secondary studentsí emotional and physical well-being. Through the use of survey and bio-manifestations of stress (cortisol levels) we examine the relationship between emotions, stress, and PI. The results indicate class-related positive emotions in undergraduate students negatively correlated with studentsí cortisol levels, indicating that the more enjoyment a student experienced in class, the lower their cortisol levels.

G 30

27 August 2015 08:45 - 10:15

Room Cyan_F2

Symposium

Emotion and affect

Emotional, attributional, and physiological reactions to grades

Keywords: Achievement,Emotion and affect,Emotion and cognition,Motivation and emotion,Quantitative methods

Sig's: SIG 8 - Motivation and Emotion

Chairperson: Astrid M.G. Poorthuis, University of Amsterdam, Netherlands

Organiser: Astrid M.G. Poorthuis, University of Amsterdam, Netherlands

Discussant: Marie-Christine Opdenakker, University of Groningen, Netherlands

In many countries, students receive grades for their school work. Grades do not only provide a convenient summary of past performance, but also have serious consequences for students by determining their academic career. Therefore, it is not surprising that many students and their parents attach great importance to grades. Given de centrality of grades in students' lives, it is vital to get a better understanding of the impact of grades on students' functioning. However, research on this topic is scarce. The aim of this symposium is to provide an overview of the emotional, attributional, and physiological effects of grades. The first presentation uses an experimental approach to measure students' physiological responses to high and low grades, as well as affective reactions and persistence. The second presentation uses a diary approach to examine emotions in response to grades and their links with daily behavioral engagement. Students do not receive their grades in a social vacuum. The third presentation takes the classroom context into account by examining whether classroom norms toward high grades predict students' affective reactions to grades and their subsequent effort, avoidance of high grades, and underachievement. The fourth presentation acknowledges that grades do not only affect students themselves, but also impact on their parents. It examines the effects of grades on parents' causal attributions for their offspring's academic successes and failures. In many schools, giving grades is a daily routine, yet this symposium may raise teachers' awareness of the possible emotional and behavioral consequences of the grades they provide.

The impact of high and low marks on studentsí psychophysiology

Experimental studies,Quantitative methods,Achievement,Emotion and affect,Higher education,Motivation and emotion

Yvonne Skipper, Keele University, United Kingdom; Russell Crawford, Keele University, United Kingdom;

The impact of marks on studentsí feelings and motivations has been documented and is discussed in other talks within this symposium. However, the physiological impact of marks has received limited attention. Studying this is important; if the marks that students receive lead to physiological stress then the associated release of adrenaline and cortisol could negatively impact learning and motivation. In this study 60 first year university students completed a rigged electronic intelligence test using Ravenís Advanced Matrices which was comprised of 5 sections. Students were told that they had got 9/10 correct in the first 3 sections. They then failed in 2 sections of the test and were told they got 2/10 correct. Following each test, participants rated their perceptions of their performance, affect and persistence. Heart rate and finger sweat index were also measured to examine their physiological response. Results suggested that, in line with previous research, following failure, students rated their performance more negatively, showed more negative affect levels and were less likely to want to persist in the tasks. However, the novel finding was that heart rate significantly reduced following failure. Results from the forthcoming finger sweat index measures will be used to explore the reasons behind this phenomenon.

Emotional reactions to grades: Effects on studentsí daily behavioral engagement

Quantitative methods,Student learning,Achievement,Emotion and affect,Secondary education,Motivation and emotion

Astrid M.G. Poorthuis, University of Amsterdam, Netherlands; Janneke van de Pol, Utrecht University, Netherlands; Tim Mainhard, Utrecht University , Netherlands;

Grades can elicit a range of emotions in students, which in turn may affect behavioral engagement in school. As studentsí engagement tends to decline after the secondary school transition, it is vital to gain more insight in studentsí academic emotions at this critical period. The present study used a diary approach to assess the link between achievement emotions and daily levels of behavioral engagement. During 10 school days, 622 students in grade 7 (i.e., the first year in secondary school) reported on their emotions in response to grades and their behavioral engagement on that particular day. Multilevel analyses showed that on days students experienced relatively high levels of joy, gratitude, and anger in reaction to their grade, they reported higher behavioral engagement. Pride and shame, often thought to be crucial achievement emotions, did not directly affect studentsí daily engagement. Only the more stable individual differences in pride were related to engagement. Shame was found to differentially affect engagement across individuals. The same was true for feelings of sadness. The strength of the association between these emotions and engagement could not be explained by individual differences in perceived self-efficacy, academic control expectations, achievement goal orientations, or an entity view on intelligence. The differences found in this study between intraindividual and interindividual processes stress the importance of using intraindividual designs.

The role of group norms and affective reactions to grades of regular and high ability students

Quantitative methods,Achievement,Emotion and affect,Social aspects of learning,Primary education,Motivation and emotion

Lisette Hornstra, Utrecht University, Netherlands; Ineke van der Veen, Kohnstamm Institute, Netherlands; Thea Peetsma, University of Amsterdam, Netherlands;

Many students do not achieve to their full potential. Especially high ability students may not always show their full potential and their cognitive abilities may not be recognised. In the present study, it was examined whether classroom norms toward high grades were associated with changes in regular and high ability studentsí motivation, i.e. changes in avoidance of getting high grades, effort, and underachievement, and whether these relations were mediated by studentsí affective reactions toward high grades. 949 students (67.8% regular ability and 32.2% high ability students) in upper primary school filled in questionnaires at the beginning and halfway through the school year. Results of multilevel mediation analyses indicated that group norms did not directly relate to affective reactions on grades of both groups, therefore no mediation was found. Group norms were directly related to changes in motivation and underachievement of regular ability students, but not for high ability students. More specifically, when group norms were more positive, regular students increased their effort and reported less underachievement. Positive affective reactions to grades were important to both groups and were directly associated with positive changes in motivation and less underachievement.

Studentsí grades and parentsí causal attributions for their offspringís school performance

Quantitative methods,Achievement,Emotion and cognition,Parental involvement in learning,Secondary education,Motivation and emotion

Emmi Enlund, University of Jyvaskyla, Finland; Kaisa Aunola, University of jyvaskyla, Finland; Jari-Erik Nurmi, University of Jyvaskyla, Finland;

This paper focuses on how studentsí school performance influences the ways in which parents attribute their successes and failures in academic settings. One-hundred and seventy-one mothers and 151 fathers of 212 adolescent completed a questionnaire concerning their causal attributions for their offspringís performance when they were 1st and 9th graders. The four most commonly used causal attributions - ability, effort, teaching, and task difficulty - were rated by parents according to their importance as a cause for the childís success or failure. Studentsí performance in reading and mathematics was tested at the beginning of grade 1 and they reported their grades at the end of 9th grade. The results showed that, after controlling for the impacts of parentsí causal attribution and childrenís math and reading performance in the 1st grade, studentsí grades were positively related to parentsí ability attributions and negatively to parentsí teaching and task difficulty attributions in success situations. These relations were especially evident among mothers. The results suggest that the childrenís academic performance is an important source of information for mothers when they assess the causes of their offspringís performance in academic settings.

K2 1

27 August 2015 11:00 - 12:30

Room Carob Mills

Keynote

Problem solving and reasoning

Epistemic Design: Creating Learning Environments to Foster Epistemic Growth

Keywords:

Sig's: SIG 26 - Argumentation, Dialogue and Reasoning

Chairperson: Rainer Bromme, University of Muenster, Germany

Epistemic design: Creating learning environments to foster epistemic growth

Instructional design,Argumentation,Problem solving,Reasoning

Clark Chinn, Rutgers University, United States;

Epistemic design refers to the design of learning environments that foster growth in epistemic competencies. These competencies include practical abilities to reason (e.g., to reason about whether global climate is changing) as well as the ability to reflect metacognitively on epistemic processes (e.g., to reflect on what kinds of methods should be used to develop claims about global climate). Epistemic design encompasses the creation of (1) effective inquiry tasks, (2) scaffolds that that support epistemic growth within these tasks, (3) assessments that enable teachers and students to monitor growth, and (4) social systems that sustain productive epistemic interactions. As curriculum standards increasingly emphasize the importance of learning to reason, the theory and practice of epistemic design becomes critical to achieving these standards. In the presentation, I will explicate a conceptual framework for epistemic design and discuss evidence for key components of this framework. First, I will outline a theoretical model for conceptualizing epistemic cognition and its development. This model specifies aims, epistemic ideals, and reliable processes for achieving epistemic aims as critical components of epistemic cognition. Second, I will discuss the design of assessments of epistemic cognition, especially those that can be embedded within instructional environments. Third, I will discuss how learning environments can be structured to promote robust epistemic growth. My overall goal is to develop a theoretical foundation that supports better epistemic design and identifies fruitful new directions for research and development.

K2 2

27 August 2015 11:00 - 12:30

Room Purple_H3 (Rialto)

Keynote

Teacher professional development

Improving Teaching Quality: A Dynamic Approach to Teacher Professional Development

Keywords:

Sig's: SIG 18 - Educational Effectiveness

Chairperson: Pamela Sammons, University of Oxford, United Kingdom

Improving teaching quality: A dynamic approach to teacher professional development

In-service teacher education,Teacher professional development,Teaching/instruction,Developmental processes

Leonidas Kyriakides, University of Cyprus, Cyprus;

This presentation draws on teacher effectiveness research to consider implications for teacher professional development. The first part provides a critical review of research on teacher professional development and illustrates the limitations of the main approaches to teacher development such as the competence-based approach and the holistic approach. The second part provides a critical review of teacher effectiveness research and shows that the whole process of searching for teacher factors had no significant impact upon teacher professional development. Meta-analyses reveal that instead of treating the active and direct teaching approaches as in contrast with the new leaning approach to teaching, an integrated approach to teaching should be adopted. The importance of investigating the additive and interactive effect of generic and content-specific teaching skills is emphasized. It is advocated that teacher professional development should be focused on how to address grouping of specific teacher factors associated with student learning outcomes and on how to help teachers improve their teaching skills by moving from using skills associated with direct teaching to more advanced skills concerned with new teaching approaches and differentiation of teaching. Thus, the third part presents the main characteristics of this dynamic approach to teacher professional development and refers to studies conducted in different countries, which illustrate how this approach can be used by policy and practice in teacher education. Moreover, experimental studies supporting the use of this approach for improvement purposes are presented. Finally, suggestions for further research utilizing and expanding the dynamic approach to teacher professional development are provided.

K2 3

27 August 2015 11:00 - 12:30

Room Mitropoli

Keynote

Reading comprehension

Children's difficulties with text comprehension: From research to practice

Keywords:

Sig's: SIG 2 - Comprehension of Text and Graphics

Chairperson: Barbara Arfe, University of Padova, Italy

Children's difficulties with text comprehension: From research to practice

Cognitive development,Cognitive skills,Comprehension of text and graphics,Reading comprehension,Early childhood education

Jane Oakhill, University Of Sussex, United Kingdom;

A substantial minority of children have problems with text comprehension, even though their word recognition is within the normal range. Research has shown that skilled and less-skilled comprehenders differ in a number of ways, and in the first part of this presentation I will discuss the relative contribution of several theoretically relevant skills and abilities to the prediction of reading comprehension (as opposed to single word reading) during the early years of schooling (age 7 to 11). In the second part of the talk, I will consider some open questions and possible future directions for this research, and will also consider the implications of the findings so far for helping children to develop and improve their comprehension skills.

H 1

27 August 2015 13:45 - 15:15

Room Orange_E1

Paper Presentation

Attitudes and beliefs

Attitudes and beliefs

Keywords: Content analysis,Student learning,Attitudes and beliefs,Higher education,Secondary education,Communities of practice,Self-efficacy,Science education,Motivation and emotion,Mixed-method research,Learning approaches,Interdisciplinary,Language (L1/Standard Language),Primary education

Sig's: SIG 4 - Higher Education,SIG 8 - Motivation and Emotion

Chairperson: Therese Bouffard, Universite du Quebec a Montreal, Canada

Running marathon, taking pictures, planting trees? Metaphors of learning in different contexts

Content analysis,Student learning,Attitudes and beliefs,Higher education,Secondary education,Communities of practice

Elisabeth Wegner, University of Freiburg , Germany; Matthias Nuckles, University of Freiburg, Germany;

Different educational settings prompt different ways of learning, because the settings differ in regards to their learning cultures. Students therefore need to be supported in transition between the learning cultures. However, to support students in such transitions, one needs to know how conceptions of learning differ between the educational settings. Metaphors have been proposed as a means of assessing implicit aspects of conceptions independently from the context. Therefore, we examined in two studies which metaphors people in different context use to describe learning. In Study 1, we compared metaphors of N=70 university students and N=69 high school students. In Study 2, we compared metaphors of N=48 university students with those of employed persons (N=47). All metaphors were classified into four categories: Learning as motivational challenge, learning as knowledge acquisition, learning as problem-solving and learning as development of personality. The vast majority of high school students described learning as a motivational challenge. In higher education, knowledge acquisition was the dominant metaphor. In contrast, half of the employed persons described learning as a process of personality development. Results indicate that metaphors can indeed be a method to compare conceptions in different contexts, and that conceptions vary strongly between contexts. Also, the differences highlight the importance of managing transitions between the contexts, in order to help individuals to adapt to the affordances of each setting.

The relevance of mindsets for education: STEM educational and career choices

Student learning,Attitudes and beliefs,Self-efficacy,Science education,Motivation and emotion

Sandra van Aalderen-Smeets, University of Twente, Netherlands; Juliette Walma van der Molen, University of Twente, Netherlands;

Studentsí implicit belief about the malleability of their intelligence (ìmindsetsî) has major impact on school motivation and performance. Students with an ìentityî mindset believe that their intelligence is fixed and cannot be improved much by effort, they show poorer self-efficacy, give up easily and adopt maladaptive strategies to cope with failure. Students with an ìincrementalî mindset believe that they can increase their abilities by working harder. These implicit theories are hypothesized to play a major role in STEM educational and career choice. This is very relevant since there is a large need for STEM oriented workers in Western countries and a need for more insight into the underlying mechanisms that influence educational and career choice in

this domain. Furthermore, these maladaptive responses are especially obstructive as they undermine creativity and problem-solving, essential skills in a reflective society. However, until now, the mechanism underlying the relation between implicit theories and STEM choice behaviour has not been specified nor investigated. In this theoretical paper we present three theoretical pathways, derived from an interdisciplinary literature review, that describe mechanisms through which implicit theories exert their influence on STEM educational and choice behaviour. The three pathways describe the influence of implicit theories on STEM choices through several mediating and moderating factors, i.e. through 1) self-efficacy, 2) stereotypical beliefs, and 3) a motivational framework. The three pathways are presented and discussed in light of their additional value to the field of STEM educational and career choices and the field of implicit theories of intelligence research.

Perceptions of learning environments: do epistemologies and mental models of learning matter?

Mixed-method research,Attitudes and beliefs,Learning approaches,Interdisciplinary,Higher education

Niclas Sandstrom, University of Helsinki, Finland; Elina E. Ketonen, University of Helsinki, Finland; Kirsti Lonka, University of Helsinki, Finland;

University students entertain various beliefs about knowledge (Hofer & Pintrich, 2002) and conceptions of learning (Vermunt, 1996; 1998). We looked at the interrelation between epistemological beliefs and mental models of learning in student perceptions of learning environments (LE). The participants (N=1515) were Finnish university students in five domains. Homogeneous student groups were formed using latent profile analysis (LPA). Students were classified using the following epistemological (Lonka et al., 2008) variables: collaboration, reflective learning, valuing metacognition, certain knowledge, and practical value. ANOVAs were conducted to examine variation in the following mental models of learning: intake of knowledge, knowledge construction and use of knowledge. Four student groups were identified: 1) Fact-oriented and collaborative, 2) Fact-oriented and individualistic, 3) Collaborative and reflective and 4) Solitary, reflective and theoretical students. Teacher students were most likely to belong in group 3), whereas majority of chemistry students belonged in group 1). Applying a mixed-method design, we compared the reported perceptions of LE of teacher students (n=10) and chemistry students (n=9) emerging from interviews. Epistemological profiles varied regarding mental models of learning. Chemistry students reported more fixed conceptions of knowledge and learning. These student groups also differed regarding how they perceived the LE and its affordances.

How confident are primary school students about their pragmatic competence?

Mixed-method research,Self-efficacy,Language (L1/Standard Language),Primary education,Motivation and emotion

Melanie Radhoff, TU Dortmund University, Germany; Raphaela Porsch, University of Muenster, Germany;

Dealing with one of the most important factors regarding academic performance and successful school careers, this paper is based on the theoretical framework of self-efficacy theory. Since self-efficacy beliefs have an influence on the studentsí motivation and their level of perseverance when obstacles occur, it is relevant to close gaps in research in order to understand the mechanisms of this phenomenon. Language deficiencies can lead to unequal educational opportunities in school but the majority of studies is primarily focused on the reading and writing competencies of students. The study to be presented refers to the concept of pragmatic competence, aiming to detect the level of self-efficacy beliefs of students at the end of primary school and to reveal characteristics of students with low self-perceptions in this area. Furthermore, aspects of verbal communication will be identified students perceive as challenging in order to conceive specific problems students might have in terms of communication.

H 2

27 August 2015 13:45 - 15:15

Room Green_A1

Paper Presentation

Cognitive skills

Cognitive skills

Keywords: Conversation/ Discourse analysis,Qualitative methods,Problem solving,Higher education,Computer-supported collaborative learning,Quantitative methods,Cognitive skills,Reasoning,Student learning,Achievement,Competencies,Writing/Literacy,Primary education,Cognitive development,Literacy,Metacognition

Sig's: SIG 12 - Writing,SIG 16 - Metacognition,SIG 20 - Computer Supported Inquiry Learning

Chairperson: Jan-Eric Gustafsson, University of Gothenburg, Sweden

Using Epistemic Synchronization Index (ESI) to measure studentsí knowledge elaboration process in CS

Conversation/ Discourse analysis,Qualitative methods,Problem solving,Higher education,Computer-supported collaborative learning

Ning Ding, Hanze University of Applied Sciences, Netherlands;

Higher-order thinking is important for problem-solving in Computer-Supported Collaborative Learning (CSCL). So far, very little research is able to capture the dynamic progress of the evolvement of individual epistemic engagement in CSCL. Questions such as how to distinguish gifted and regular students regarding knowledge elaboration remains a black box. Based on three cognitive modes from Kumpulainen and Mutanen (1999), we (Author, 2009; 2010) developed a

coding system to measure studentsí epistemic engagement, which was termed as ìelaboration valuesî referring off-task, on-task and elaboration activity. Each piece of student online messages was coded into a discrete numerical value as -1, 0, or +1. The current study explores a method to distinguish the individual dynamic process of epistemic involvement in CSCL. It was conducted in a Dutch university. Two female bachelor students participated in seven online collaboration sessions, solving statistics questions in an online text-only chatting room. The unit of analysis was defined as each message emerging at a recorded timeslot. We used a series of equations to arrive at an Epistemic Synchronization Index (ESI). ESI ranges from 0 to 1. The smaller, the more symmetrical of studentsí epistemic engagement. We are also able to distinguish whether a gifted student contributes more to the online problem solving than his/her partner. With the help of ESI, teachers as well as researchers are able to locate the question that individual students involved at a different epistemic level during collaboration, in other words, an unbalanced collaboration.

Getting to the source: What contributes to relational reasoning performance?

Quantitative methods,Cognitive skills,Problem solving,Reasoning

Patricia A. Alexander, University of Maryland, United States;

Relational reasoning has been identified as a process important for academic performance. Yet, studies of relational reasoning have typically examined the outcomes of reasoning rather than the process, and have been limited to examining a single type of reasoning (i.e., analogy) to the exclusion of others (e.g., anomaly, antinomy, antithesis). Although factors such as working memory have been found to contribute to relational reasoning performance, little is known about how these factors contribute to the component processes of relational reasoning (i.e., encode, infer, map, apply) or how these component processes differ across individuals varying in ability. The present study utilizes Bayesian network analysis to examine the conditional probabilities that high and low performing undergraduate students reach each of the sequential component processes of relational reasoning across four types of relations. Further, it investigates the degree to which visuospatial working memory plays a role in each process. Results indicate that low performing students experience particular difficulties in identifying relevant inferences and in mapping those inferences. This may be due in part to the stronger relation identified between working memory and the processes of inferring and mapping. The outcomes from this study contribute to understandings of the sources of success and failure in reasoning for students at different levels, and identify potential entry points for intervention research.

Does proficiency in spelling, grammar and punctuation predict success with writing?

Quantitative methods,Student learning,Achievement,Competencies,Writing/Literacy,Primary education

Tessa Daffern, Charles Sturt University, Australia; Noella Mackenzie, Charles Sturt University, Australia;

Being literate in the twenty-first century demands individuals to create and interpret patterns of meaning that may be visual, audio, gestural, tactile and spatial (Kalantzis & Cope, 2012). While writing is one central part of being literate as it provides a means for personal reflection, creativity and intellectual inquiry, how important is it to learn basic written language skills at school, such as spelling, grammar and punctuation? This paper draws on data from 819 Australian primary school students to explore the relationship between three language convention variables (spelling, grammar and punctuation) and written composition, as measured by the National Assessment Program Literacy and Numeracy (NAPLAN) Language Conventions Test and the Writing Test. Findings for the study indicate that spelling, grammar and punctuation jointly influence written composition, and that spelling is the main predictor of written composition. Implications for the educational practice of writing in the contemporary context are discussed.

Auto-explaining while reading in 8 to 11 years old French children

Cognitive development,Literacy,Metacognition,Writing/Literacy,Primary education

Maryse Bianco, Universite Pierre-Mendes-France, France; Nardy Aurelie, Universite Stendhal, France; lima laurent, universite P. Mendes France, France;

The study presented is focused on the study of the development of reading comprehension strategies in children aged from 8; to 11; using a thinking aloud methodology. 79 children read aloud 2 narrative texts. At 6 pre-defined test points, they were asked to say aloud what they understood at that point in the story. Each verbal protocol was parsed into clauses that were categorized according to a coding scheme inspired from previous research (Kendeou & Van den Broek, 2005; Magliano & Millis, 2003). Reading and oral comprehension, reading fluency, working memory capacities as well as cognitive development (verbal and nonverbal) were further and independently assessed. The results extend the existing research by showing that reading strategies can be elicited with young children and that they distinguish high and low comprehenders early on the process of reading acquisition. Implications in educational settiings are discussed.

H 3

27 August 2015 13:45 - 15:15

Room Brown_B1

Paper Presentation

Comprehension of text and graphics

Comprehension of text and graphics

Keywords: Qualitative methods,Instructional design,Comprehension of text and graphics,Science education,Higher education,Multimedia learning,Experimental studies,Mixed-method

research,Psychometrics,Quantitative methods,Assessment methods and tools,Educational technology,Cognitive skills,Reading comprehension,Secondary education,Synergies between learning, teaching and research,Literacy

Sig's: SIG 2 - Comprehension of Text and Graphics

Chairperson: Alberto Nagle Cajes, Universidad ORT-Uruguay, Uruguay

Can interactive communication promote student use of diagrams in explaining what they have learned?

Qualitative methods,Instructional design,Comprehension of text and graphics,Science education,Higher education,Multimedia learning

Emmanuel Manalo, Kyoto University, Japan; Yuri Uesaka, The University of Tokyo, Japan; Chris Sheppard, Waseda University, Japan;

This study examined whether interactive communication can be used for improving studentsí spontaneity in using diagrams when explaining what they have learned. Eighty-four university students were randomly placed in interactive or non-interactive pairs, and were provided different passages to read. While reading they could take notes. Interactive pairs then took turns at explaining what they had read directly to each other, and could use a sheet of paper provided to write anything during that verbal explanation. In contrast, non-interactive pairs explained to a digital audio recorder, which they exchanged together with anything they wrote on a sheet of paper that was also provided. Finally, the students were asked to produce a written explanation of what they had read for an imaginary person who did not know anything about the topic. The number of idea units that the students represented in text and/or in diagrams in notes (while reading), the verbal explanation (on the sheet provided), and the written explanation were counted and analyzed. Results indicate that diagrammatic representations (relative to text representations) increased in the interactive condition ñ but only during the verbal explanation task. No transfer of increased diagram use occurred to the subsequent production of a written explanation. These findings suggest that interactive communication may not be enough in promoting student spontaneity in using diagrams in explanations: interventions may have to additionally address other needs, such as the development of knowledge and skills in deciding what diagrams to supplement text with (in the absence of immediate intended-audience feedback).

Multimedia effects in assessment: How pictures influence test characteristics and item processing

Experimental studies,Mixed-method research,Psychometrics,Quantitative methods,Assessment methods and tools,Comprehension of text and graphics

Marlit Annalena Lindner, Leibniz Institute for Science and Mathematics Education (IPN), Germany; Jan Marten Ihme, Leibniz Institute for Science and Mathematics Education (IPN),

Germany; Steffani Sass, Leibniz Institute for Science Education and Mathematic, Germany; Olaf Koeller, Leibniz Institute for Science and Mathematics Education, Germany;

Representational pictures are frequently added to test items, while their impact on psychometric parameters and cognitive processing of the test material is mostly undetermined. We experimentally manipulated items by adding a picture to the item stem (or not), to investigate item difficulty changes and to explore interactions of pictures with studentsí general cognitive and reading abilities as well as with their working memory capacity. Furthermore, eye movements were recorded to investigate the pictures influence on item processing. A total number of N = 769 students participated in three interrelated studies (paper-pencil, laptop, eyetracking). A significant multimedia-effect occurred for item difficulty parameters: Items with pictures were easier to solve than items with text only. Studentsí characteristics did not moderate the picture-effect on item difficulty despite for reading speed, which correlated significantly higher with text-only items. Item solution times were merely affected by representational pictures, while eye movement analyses reveal that pictures most of all draw attention away from the text. Thus, students compensated the time spent on processing the picture by reducing the time spent on processing the equivalent text information, which may provide an explanation for the finding that pictures reduce item difficulty and the interaction of the effect with studentsí reading speed.

Too demanding, too complex? The role of executive working memory functions in reading digital text

Quantitative methods,Educational technology,Cognitive skills,Comprehension of text and graphics,Reading comprehension,Secondary education

Carolin Hahnel, German Institute for International Educational Research (DIPF), Centre for International Student Assessment (ZIB), Germany; Frank Goldhammer, German Institute for International Educational Research (DIPF), Centre for International Student Assessment (ZIB), Germany; Ulf Kroehne, DIPF, Germany; Johannes Naumann, Geman Institute for International Educational Research, Germany;

When they read on the Internet, students often encounter text that is structured in a hypertext format. Hypertexts are supposed to demand for additional cognitive resources in readers ñ additionally to the process of reading comprehension. In this study, we focused on the role of updating as an executive working memory function in reading and comprehending digital text. We hypothesized that updating should have an unique impact on studentsí digital reading proficiency in addition to their reading comprehension. Moreover, we expected studentsí updating skill especially to account for interindividual differences in demanding tasks. Demanding tasks are distinguished by (1) the primary focused reading aspect reflecting different required cognitive processes and (2) the extension of a hypertext environment. To test our hypotheses, we investigated studentsí skills in digital reading, updating, and reading comprehension as well as itemsí reading aspect and the number of nodes in their hypertext environment (N = 418). Data was collected in the PISA context. Studentsí updating skill, their reading comprehension, and both item properties predicted studentsí performance on digital

reading tasks. Implications for dealing and learning with hypertexts as well as consequences regarding of the dimensionality of the digital reading construct will be discussed.

A theoretical framework for information integration processes during reading of multiple documents

Synergies between learning, teaching and research,Comprehension of text and graphics,Literacy,Reading comprehension,Higher education

Cornelia Schoor, University of Bamberg, Germany;

Reading multiple documents on one topic or question is an activity that not only scientists, university students or other people experienced in handling several sources encounter but also common people. A document in this context might be, for example, an internet webpage that contains text and pictures or a newspaper article. Multiple documents most probably have different authors and are usually not designed to facilitate learning of the topic, but might openly or more subtly disagree with each other. Thus, comprehending multiple documents is a skill that goes beyond reading a single text, and this skill is increasingly added to literacy tests in large-scale-assessments (e.g., NEPS, PISA). An especially challenging demand of this activity is to integrate information across several documents. While most of the research on multiple documents has concentrated on conditions that are beneficial for information integration and conflict detection, research on the process of integrating information from multiple documents is scarce. Therefore, the present contribution extends research on multiple documents and on multiple representations and deduces a theoretical framework for the analysis of information integration processes during multiple documents reading. In addition, factors that probably influence these integration processes will be derived, suggesting future research questions.

H 4

27 August 2015 13:45 - 15:15

Room Green_A2

Paper Presentation

Early childhood education

Early childhood education and culture and education

Keywords: Quantitative methods,Student learning,Parental involvement in learning,Social sciences,Early childhood education,Learning in context,Experimental studies,Educational attainment,Social development,Language (L1/Standard Language),Integrated learning,Cognitive skills,Competencies,Primary education,Knowledge creation

Sig's: SIG 21 - Learning and Teaching in Culturally Diverse Settings,SIG 5 - Learning and Development in Early Childhood

Chairperson: Anne Nevgi, University of Helsinki, Finland

What early home learning environments tell us about gender differences in competencies

Quantitative methods,Student learning,Parental involvement in learning,Social sciences,Early childhood education,Learning in context

Tobias Linberg, Leibniz Institute for Educational Trajectories, Germany; Ilona Relikowski, University of Bamberg, Germany;

Because gender differences in language and reading competencies are small in childhood and become more pronounced across school age, it is relevant to inspect conditions that possibly contribute to the explanation of the formation of these differences. We focus on proximal processes of the early home learning environment, hypothesize three different mechanisms which can lead to gender differences, and analyze them with data on 5-year old children from the German National Educational Panel Study (NEPS). Finding no differences in language competencies but in the home learning environments proximal processes, childrenís personality traits mediate those differences in part, while results on moderated effects remain somewhat inconclusive.

Effect of teacher differentiation practices on kindergarten childrenís cognitive and social outcomes

Experimental studies,Educational attainment,Social development,Language (L1/Standard Language),Early childhood education,Integrated learning

Elma Dijkstra, Open University, Netherlands; Amber Walraven, Radboud University, Netherlands; Ton Mooij, Open University, Netherlands; Paul A. Kirschner, Open Universiteit, Netherlands;

This presentation discusses the effectiveness of integrated in-school training of Dutch kindergarten teachersí differentiation practices on the cognitive and socioemotional development of (initially) excellent and nonexcellent kindergarten children in the first year of a 2-year intervention program. The training focuses on screening the childrenís school-entry characteristics, matching their learning needs with curricular activity levels, and implementing a school-wide approach to differentiation to optimally meet those needs. Schools were randomly assigned at the start of the first year to an intervention condition (n = 18 schools with 611 kindergarten children) or a control condition (n = 19 schools with 634 children). A multilevel cluster randomized control design was used with a pretest and a posttest. Results showed that the intervention positively influenced the cognitive achievement of kindergarten children. Moreover, a small positive intervention effect on behavior development was found. No differences occurred between excellent and nonexcellent childrenís development. In the first experimental year, thus, the intervention positively affected the cognitive and behavioral development of all kindergarten children. Limitations of the study and further research steps will be discussed.

Educational functioning and outcomes of bi-ethnic Dutch children

Quantitative methods,Cognitive skills,Competencies,Social development,Primary education,Knowledge creation

Merlijn Karssen, Kohnstamm Institute, University of Amsterdam , Netherlands; Ineke van der Veen, Kohnstamm Institute, University of Amsterdam, Netherlands; Monique Volman, University of Amsterdam, Netherlands;

The present study examined the educational outcomes and functioning of bi-ethnic students compared with mono-ethnic majority and mono-ethnic minority students in the Netherlands. Furthermore, this study assessed whether the ethnic background and gender of the migrant parent and socio-economic status (SES) influence the educational outcomes and functioning of bi-ethnic students. Bi-ethnic students have one migrant and one non-migrant parent. It was found that bi-ethnic students do not differ from mono-ethnic majority students in their cognitive achievement, social-emotional functioning or citizenship knowledge. However, bi-ethnic students scored higher on cognitive outcomes, social-emotional functioning and citizenship knowledge than mono-ethnic minority students did. Only for citizenship orientation was it found that bi-ethnic students score in-between mono-ethnic majority and mono-ethnic minority students. Finally, the ethnic background and gender of the migrant parent and SES influenced the cognitive outcomes, social-emotional functioning and citizenship competences. These findings indicate that bi-ethnic students cannot simply be grouped together with minority students.

H 5

27 August 2015 13:45 - 15:15

Room Purple_H3 (Rialto)

Paper Presentation

Educational policy

Educational policy and metacognition/reflection

Keywords: Quantitative methods,Educational policy,Developmental processes,Early childhood education,Metacognition,Self-regulation,Higher education,Multimedia learning,Qualitative methods,Assessment methods and tools,Science education,Social sciences,Primary education,Experimental studies,Reflective society,Achievement,Values education

Sig's: SIG 1 - Assessment and Evaluation,SIG 16 - Metacognition,SIG 18 - Educational Effectiveness,SIG 25 - Educational Theory

Chairperson: Herbert Altrichter, Johannes Kepler University Linz, Austria

The effects of early grade retention: Effect modification by ability and age

Quantitative methods,Educational policy,Developmental processes,Early childhood education

Machteld Vandecandelaere, KU Leuven, Belgium; Griet Vanwynsberghe, KU Leuven, Belgium; Bieke De Fraine, KU Leuven, Belgium; Jan Van Damme, KU Leuven, Belgium;

This study examined the effects of early grade retention throughout primary school and effect modification by ability and age. Kindergarten repeaters, first grade repeaters and promoted children were compared with regard to their development in mathematics achievement, wellbeing and peer relations. Analyzing data from a large-scale longitudinal study using covariate balancing propensity score weighting, the findings reveal that, at the cost of an extra year, early grade repeaters do not benefit from their retention year with respect to their mathematics development. Rather, first grade retention is harmful for high ability and younger childrenís mathematics development. In contrast, early grade retention compared to promotion leads to higher levels of wellbeing in low ability children, regardless of their age. We did not detect an effect of early grade retention on the development in peer relations.

Product vs Process: PA influence on time and use of SRL processes on relevant pages with MetaTutor

Metacognition,Self-regulation,Higher education,Multimedia learning

Michelle Taub, North Carolina State University, United States; Roger Azevedo, North Carolina State University, United States; Sadie Lisk, North Carolina State University, United States; Gina Kabat, North Carolina State University, United States; Jesse Farnsworth, North Carolina State University, United States; Seth A. Martin, North Carolina State University, United States; Tristan Smith, North Carolina State University, United States;

SRL research can focus on the impact of both process and product data on learning. The goal of this study was to compare how sub-goal quiz scores (process data), and post-test scores and proportional learning gains (product data) are impacted by prompts and feedback provided by Pedagogical Agents as students spend time on and use SRL processes on relevant, compared to irrelevant content pages, as they interact with MetaTutor. Results indicated significant differences between experimental conditions (PF vs. C) on time spent and use of SRL processes on relevant, compared to irrelevant pages; and that sub-goal quiz scores significantly predicted time spent and use of SRL processes on relevant vs. irrelevant pages, while post-test score and proportional learning gain were not significant predictors of time spent and use of SRL processes on relevant vs. irrelevant pages. The implications from these results stress the importance of designing PAs that foster effective SRL beyond the learning process, and to learning outcomes and transfer.

Student stories about their malleability in relation to grades and national tests in school year six

Qualitative methods,Assessment methods and tools,Educational policy,Science education,Social sciences,Primary education

Ragnhild Lofgren, Linkoping University, Sweden; Hakan Lofgren, IBL, Sweden; Viveca Lindberg, Karlstad University, Sweden;

Abstract The aim of the paper is to investigate studentsí experiences of the national test as an effect of changes in the education system toward a stronger state interest in knowledge measurement in a decentralized and competitive school system. Our research questions are: What are studentsí experiences of national tests in relation to their grades? How do the students talk about their own malleability? The students were interviewed in a group of students (n. 2-5). They were asked to refer to their grades in relation to the national tests (e.g. Are the national tests important for your grades?) and about their possibilities to change their grades. All interviews were audio recorded and transcribed. We listened to the interviews and read the transcripts and conducted an analysis of narratives of studentsí stories about their experiences of the national test. The students tell about a great variation when talking about the role of national tests for their grades, some students say that the national tests are very important for their grades whereas other say that the national tests only can raise the grades never lower them and some state that the national tests are of no importance for their grades. They also tell stories about their ability to change their grades later on in school. However, from a student perspective the national tests and the grades in school year six do not just create opportunities for students, they also limit studentsí opportunities.

Succeeding in the educational system: From social desirability to social utility

Experimental studies,Reflective society,Achievement,Metacognition,Values education

Cristina Aelenei, Clermont University, France; Delphine Martinot, Clermont University, France; Celine Darnon, Universite Blaise Pascal, France;

Despite the fact that girls outperform boys in school, (in terms of school grades, attainment, and achievement on standardized tests), the academic choices and the length of pursuing an academic track do not favor them. We argue that this paradox is possible because of a specific valuesñambivalence in the educational system. More specifically, we think that at a first level, namely in terms of what is socially desirable, the values promoted (i.e., equality, helpfulness) seem to meet the need to all students and particularly to fit girls-socialization values. However, at a second level, in terms of what is socially useful for succeeding in a gradually more selective system, the values are shifting towards a more masculine-socialization prototype (i.e., values of dominance, success, ambition). We tested our hypotheses in two studies on a population of 118 primary school teachers, 43 high-school and 81 college students. In a first study, primary school teachers evaluated the social desirability and social utility of a pupilís-portrait. In a second study, high school and college students were asked to answer a values questionnaire with different self-presentation strategies, namely, to appear as likable versus as likely to succeed. The results support our assumptions, documenting that girls fit better the prototype of what is socially desirable in school but not of what makes someone succeed in the system (i.e., social utility). The reverse occurs for boys.

H 6

27 August 2015 13:45 - 15:15

Room Brown_B2

Paper Presentation

Higher education

Higher education

Keywords: Morality,Social interaction,Values education,Higher education,Meta-analysis,Teacher professional development,Engineering,Science education,Quantitative methods,Educational attainment,Social aspects of learning,Student learning,Teaching/instruction,Emotion and affect,Emotion and cognition,Interdisciplinary

Sig's: SIG 13 - Moral and Democratic Education,SIG 4 - Higher Education

Chairperson: Anneli Frelin, University of Gavle, Sweden

Students' justice experience and perceptions of faculty incivility in higher education

Morality,Social interaction,Values education,Higher education

Yariv Itzkovich, Ashkelon Academic College, Israel; Dorit Alt, Kinneret College on the Sea of Galilee, Israel;

This study was aimed at comprehensively assess perceived faculty incivility (FI) as a function of an individual experience of teachers' just (TJ) behavior, while considering the belief in a just world (BJW) as a personal characteristic that has the potential to enhance TJ. Three scales were submitted to 744 undergraduate college students: Perceived Faculty Incivility Scale [PFIS], personal belief in a just world scale, and teachers' justice scale. Path model results indicated that students who evaluated their teachersí behavior towards them personally as just, have reported on less FI occurrences in the classroom. The personal BJW variable connection to the perceived FI was mediated by the TJ behavior factor. Implications of these findings and directions for future research are discussed.

Professional development in the context of a higher education curriculum innovation

Meta-analysis,Teacher professional development,Engineering,Science education,Higher education

Inken Gast, University of Twente, Netherlands; Kim Schildkamp, University of Twente, Netherlands; Jan Van der Veen, Twente University, Netherlands;

The University of Twente has recently reformed its bachelor programs using principles of project-based-education. Each bachelor year has been divided into four modules each consisting of a central project and various supporting courses. The Twente Educational Model (TEM) brings a lot of changes for the teaching staff. Teachers now have to work together in multidisciplinary teams to develop the new modules, get familiarized with the principles of project-based-education, become tutors for student groups, implement new ways of assessment,

make use of activating teaching methods and develop TPACK-skills. To ensure a successful implementation of TEM, the university needs to facilitate and support the professional development of its teaching staff. To evaluate how teacher professional development during a curriculum innovation can best be facilitated, a systematic review study has been carried out. Scopus, Web of Science, PsycInfo and ERIC have been searched for relevant articles. All relevant articles were categorised using various dimensions such as type of professional development activity, subject of the activity, research type, research methods, experience level of participants, teaching domain and context of the study. The results indicate a research gap for just-in-time professional development methods in higher education, as most research focuses on the more traditional types of professional development interventions such as workshops and training programs. Furthermore, only few report on the professional development of teachers in the context of a curriculum innovation in higher education.

Can normative factors influence academic persistence? An investigation through the planned behaviour

Quantitative methods,Educational attainment,Social aspects of learning,Higher education

Nathalie Roland, Universite catholique de Louvain (UCL), Belgium; Mariane Frenay, Universite catholique de Louvain (UCL), Belgium; Gentiane Boudrenghien, Universite catholique de Louvain (UCL), Belgium;

Academic persistence has been studied by a lot of researchers in the past years, not only because of high dropout rates in first year at university but also because persistence is considered as a key determinant of academic achievement. Researchers mainly focused on background and motivational determinants of persistence. However, few studies took normative factors such as social norms into account to explain persistence. Yet, it could be an essential factor of influence. Thatís why we decided to study if including injunctive and descriptive norms to the investigation could improve the understanding of persistence. To this end, we focused on a theoretical framework which consider for background, motivational and normative factors, named the planned behaviour theory. Two studies were conducted in which first year college students (N1= 152; N2 = 848) were asked to answer self-reported questionnaire. We used a structural equation modelling technique to test if norms could improve the understanding of persistence. In both studies, the model included injunctive norms fit better with the data than the model without norms. However, it was not the case with descriptive norms. These original results led to future research and new practical implications.

Conceptualising emotional literacy in university education: A theoretical analysis

Student learning,Teaching/instruction,Emotion and affect,Emotion and cognition,Interdisciplinary,Higher education

Kathleen M Quinlan, University of Oxford, United Kingdom;

Emotions are intertwined with cognition and influence problem-solving, decision-making, social interactions and social institutions. Yet higher education largely neglects the role of emotions in

learning, teaching and curricula. This paper blends psychological and sociological accounts of emotion to construct a theoretical framework upon which an emotional literacy curricula for university students could be designed. I analyse a short case study of a racially charged classroom episode to illustrate the implications of two competing theories. I interpret the case first through Grossí (2001, 2006) model of adult emotional regulation to highlight individual agency and cognitive processes in the regulation (control) of oneís emotions. Then I re-interpret the case, drawing on Zembylasí (2002, 2007, 2012) sociological perspective to highlight the relational and political nature of emotions. Combining those two perspectives, I demonstrate that emotions are both socio-cultural phenomenon and that there are processes individuals can use to better understand their emotional responses, within a social and historical context. I conclude that we need to bring together psychological and sociological perspectives to form a framework that preserves individual agency while promoting awareness and critique of the socio-cultural roots of emotions. This combined approach offers a curricular foundation, not merely for controlling or regulating emotions, but for critically understanding them and opening up other options at an individual and societal level.

H 7

27 August 2015 13:45 - 15:15

Room Brown_B4

Paper Presentation

Higher education

Higher education

Keywords: Teaching/instruction,Interdisciplinary,Higher education,Motivation and emotion,Phenomenography,Qualitative methods,Morality,Content analysis,Quantitative methods,Mentoring in teacher education,Researcher education,Reflection,Self-efficacy

Sig's: SIG 3 - Conceptual Change,SIG 4 - Higher Education,SIG 9 - Phenomenography and Variation Theory

Chairperson: Cheryl Foxcroft, Nelson Mandela Metropolitan University, South Africa

Studentsí perceptions of a teaching evaluation process and their relationships with SET scores

Teaching/instruction,Interdisciplinary,Higher education,Motivation and emotion

Pieter Spooren, University of Antwerp, Belgium; Wim Christiaens, University of Antwerp, Belgium;

Previous research has shown that many student, teacher, and course characteristics are related with SET scores. However, the relationship between studentsí perceptions of (the value) of SET procedures and their actual SET scores has not been studied before. The present study examines the relationship between studentsí perceptions of a SET procedure and their actual evaluation behavior. 974 students from 6 different academic disciplines at a Belgian university completed both a SET questionnaire and an adapted version of the Studentsí Perceptions of a Teaching Evaluation Process questionnaire. Structural equation modeling revealed a statistically and significant positive relationship (.20) between a latent construct measuring ëvalue of SETí and SET scores as derived from a global factor measuring general teaching competency. Students who value SET procedures tend to provide higher SET scores. It is important to recognize that, based on their conceptions about their role as evaluators of university professors, students might differ in their perceptions of teaching competence.

Positive examples of university teaching practice

Phenomenography,Qualitative methods,Teaching/instruction,Morality,Higher education

Kyriaki Doumas, Linnaeus University, Sweden;

The aim of the research is to investigate positive examples of University teaching practice, as they are experienced and described by the students. Studentsí experiences of personal meaning and joy in teaching and understanding of subject matter are particularly noted. In-depth interviews were used to investigate the experiences of the students. The collection of the research material was realized in three universities in Greece, during an academic year. Twelve students of three courses, ìIntroduction to Philosophyî, ìRelational Pedagogyî and ìSociology of Educationî participated in the research. The data analysis was performed according to the methodology of contextual analysis. After systematic comparisons between the participantsí accounts, similarities and differences were discerned that constituted the basis for the delimitation and description of the phenomenon under investigation. Three interconnected aspects were identified describing studentsí experiences of their teaching: In-depth teaching and understanding of subject matter, Dialogical interrelatedness and reflection and Teacherís involvement in teaching and in studentsí understanding.

Early career researchersí pedagogical beliefs and their effect on teaching self-efficacy

Content analysis,Quantitative methods,Mentoring in teacher education,Researcher education,Reflection,Self-efficacy

Andria Andiliou, , United Kingdom;

A teaching philosophy statement is typically a narrative and it provides a conceptualization of effective teaching and meaningful learning within a specific discipline. A teaching philosophy statement is a systematic and critical rationale that focuses on the important components defining effective teaching and learning in a particular discipline and or institutional context (Schonwetter, Sokal, Friesan, &Taylor, 2002). In a teaching philosophy statement an instructor explains oneís beliefs about how students learn and what his/her role is in facilitating learning

(Chism, 1998; Kaplan et al., 2008). In this study we examined the teaching philosophy statements of 30 early career researchers to explore their pedagogical beliefs about effective teaching, the extent to which these beliefs vary across disciplines, and how they impact early career researchersí college teaching self-efficacy. From the philosophy statements analysed so far early career researchers discuss in their philosophies a) learning goals for their students, (b) teaching methods/learning activities, (c) assessment strategies/techniques, and (d) educational technology. Further analysis is required to determine the impact of these pedagogical beliefs on researchersí college teaching self-efficacy. Implications for continued professional development programs for early career researchers are discussed.

H 8

27 August 2015 13:45 - 15:15

Room Brown_B5

Paper Presentation

Instructional design

Instructional design

Keywords: Experimental studies,Instructional design,Teaching/instruction,Problem solving,Science education,Secondary education,Comprehension of text and graphics,Multimedia learning,Design based research,Student learning,Primary education,Quantitative methods,Higher education,Computer-assisted learning

Sig's: SIG 6 - Instructional Design,SIG 9 - Phenomenography and Variation Theory

Chairperson: Paul Ginns, University of Sydney, Australia

Fully-guided or minimally-guided instruction? An investigation in physics learning

Experimental studies,Instructional design,Teaching/instruction,Problem solving,Science education,Secondary education

Chih-Yi Hsu, National Tou-Liu Senior High School, Taiwan; Slava Kalyuga, University of New South Wales, Australia;

The present study inquired into the contradictory assertions between cognitive load theory and the learning frameworks of invention activity and productive failure by comparing the learning effects of the four experimental conditions involving different levels of scaffolding during problem solving activities at the first learning stage followed by identical direct instruction (worked example-problem pairs) at the second stage. Sixty Year 10 students were assigned to one of the following four experimental groups - problem-solving only (N = 16), problem-solving with principle guidance ñ i.e., the information about the relevant principles (N = 16), problem-

solving with principle guidance and reflection (N = 16), and worked example (N = 12). The results showed that problem solving with delayed direct instruction (i.e., the former three conditions) did not result in superior learning compared to the fully direct instruction only (i.e., the fourth condition) as found in the studies within the frameworks of productive failure and invention learning. However, the problem solving with principle guidance and reflection group outperformed the other two groups with equivalent problem solving conditions without reflection or principle guidance, and performed at least no worse than the full direct instruction condition. A worked example effect was found for performance scores and subjective ratings of mental effort investment during the first learning stage when fully direct instruction was compared with the pure problem solving condition, but not with the problem solving condition that included principle guidance and reflection.

Testing the model-observer similarity hypothesis with worked examples

Experimental studies,Instructional design,Comprehension of text and graphics,Problem solving,Multimedia learning

Vincent Hoogerheide, Erasmus University Rotterdam, Netherlands; Anna Vrins, Erasmus University Rotterdam, Netherlands; Sofie Loyens, University College Roosevelt, Netherlands; Tamara Van Gog, Utrecht University, Netherlands; Fedora Jadi, Erasmus University Rotterdam , Netherlands;

Example-based learning is a very effective and efficient instructional strategy for novices, and can be implemented either using text-based worked examples in which the procedure is written out step by step, or using video-based modeling examples, in which an instructor (the ëmodelí) demonstrates a procedure. The model-observer similarity (MOS) hypothesis has mainly been investigated with modeling examples. It predicts that the effectiveness of modeling partly depends on the degree to which learners perceive the models to be similar to them, for instance in terms of gender of expertise. Findings have thus far been inconsistent, however, and in many studies not only the model characteristics, but also the content differed across conditions, making it unclear whether MOS caused the effects. Therefore, two experiments were conducted that presented secondary education students with the same four worked examples in all conditions. In Experiment (N = 130), students were led to believe via pictures and a short story that the worked examples were created by a either a peer student or a teacher. No effects on cognitive and affective aspects of learning were found. Experiment 2 (N = 146) followed the same procedure, but male and female students were led to believe that the examples were created by a peer student of the same or opposite sex. Male students showed higher performance and confidence than female students, but no effects of MOS were found. These findings suggest that MOS does not play a role in learning from worked examples.

Young childrenís learning about day and night: An interventional study

Design based research,Instructional design,Student learning,Science education,Primary education

Mona Holmqvist Olander, University of Gothenborg, Sweden; Anette Fredriksson, University of Gothenburg, Sweden;

This study aims to describe in what ways different designs of instruction relates to the childrenís ways to develop learning regarding their understanding of day and night. Three groups of childrenís developed learning are followed during three different lessons. 44 pupils between 6 and 9 years, divided into three age-mixed groups (n = 16, 15 and 13 children), participated. The design is made in an iterative process, which means one design is tried out in one lesson and group of children. The qualitative analysis of the lesson, in combination with the results of the pre- and post-tests are taken into consideration in the design of the next lesson. The aim is to revise the lesson to make the instruction even more specified and facilitated to the childrenís needs. The design is made based on variation theory, and the use of patterns of variations of the object of learning strives against making the critical aspects of the content possible to discern for the children. The data consists of interviews, videotaped lessons, observations and tests before and after each lesson. The interventions have been conducted in mixed age-groups from preschool to school year 3. The greatest increase regarding test scores was found in the third lesson, from 23.1 to 76.9%. The differences between the designs in the lessons are described in detail and related to the learning outcomes.

Differential effects of cueing on analyzing propaganda

Experimental studies,Quantitative methods,Instructional design,Higher education,Secondary education,Computer-assisted learning

Martin Merkt, Knowledge Media Research Center, Germany; Florian Sochatzy, KU Eichstaett-Ingolstadt, Germany;

The way that recipients conceive messages in videos is influenced by cinematic techniques. Therefore, awareness of these techniques is necessary if students are asked to work with videos as historical sources. In this manuscript, we report two studies that were interested in the effects of cueing on the analysis of propaganda. In this respect, we tested the effects of cueing in training clips on the analysis of test clips that did not include any cues. In Study1, cueing the use of cinematic techniques on a category level (e.g., camera angle) in the training clips resulted in less detailed analyses of subsequent propaganda clips with regard to identifying the techniques and hardly affected interpretation of the techniquesí effects. Therefore, in Study2, we added more specific manifestation cues (e.g., low angle shot) and more general cues (i.e., cinematic techniques). Beyond replicating the main findings of Study1, both new cueing conditions resulted in more detailed analyses than category cues with manifestation cues resulting in most detailed analyses. With regard to interpreting the techniquesí effects, all cueing conditions resulted in improved performance, with manifestation cues tending to result in the best performance. Overall, the current studies constitute an important starting point for investigating the differential effects of different kinds of cues on learnersí analysis and interpretation of propaganda. Beyond that, our findings have implications for general media literacy when recipients watch biased videos.

27 August 2015 13:45 - 15:15

Room Green_A3

Paper Presentation

Language education

Language education

Keywords: Action research,Second language acquisition,Peer interaction,Language (Foreign and second),Higher education,Motivation and emotion,Quantitative methods,Synergies between learning, teaching and research,Self-efficacy,Vocational education,Conversation/ Discourse analysis,Qualitative methods,Meta-analysis,At-risk students,Language (L1/Standard Language),Early childhood education

Sig's: SIG 1 - Assessment and Evaluation,SIG 12 - Writing,SIG 4 - Higher Education,SIG 5 - Learning and Development in Early Childhood

Chairperson: Catherine Dimitriadou, University of Western Macedonia, Greece

"TED karaoke" as a practice task and its effect on intelligibility

Action research,Second language acquisition,Peer interaction,Language (Foreign and second),Higher education,Motivation and emotion

Ngar-Fun Liu, The Chinese University of Hong Kong, Hong Kong;

This paper presents preliminary findings of a practice task, termed ìTED karaokeî, used in a postgraduate presentation skills course in Hong Kong. ìTED karaokeî is a novel attempt at encouraging conscious practice of lexical stress and rhythm in English, without the speech content to worry about. TED talks provide speaking models and the karaoke part provides speaking practice. ìTED karaokeî involves mimicking 30 seconds of a TED speech. Learners have a model to imitate and time to practice in private before performing in public and receiving feedback. The research question is whether conscious practice, aided not by pronunciation instruction, but by an awareness of prosody, can improve the intelligibility of ìfossilizedî Chinese learnersí speech. A pre- and post-practice design is used and recordings are collected in the first and seventh week of the term. Five native and five non-native speakers of English are recruited as raters of 30 randomized pre- and post-practice recordings. Ratings show significant improvement in the intelligibility of learnersí speech as judged by both native and non-native English listeners. Furthermore, learnersí impression of ìTED karaokeî practice, measured by a questionnaire, indicates agreement with rater judgment, i.e., learners find the practice more effective in improving their intelligibility and confidence than fluency. This study contributes to research that shows 1) conscious practice matters more than explicit instruction for adult learners; 2) intelligibility is partially independent from other speech dimensions such as fluency;

and 3) non-native-English listeners tend to be harsher raters of intelligibility than native-English listeners. (247 words)

Promoting general writing competence in vocational schools: an intervention study

Quantitative methods,Synergies between learning, teaching and research,Self-efficacy,Language (Foreign and second),Vocational education

Liana Konstantinidou, Zurich University of Applied Sciences, Switzerland; Joachim Hoefele, Zurich University of Applied Sciences, Switzerland; Otto Kruse, Zurich University of Applied Sciences, Switzerland; Sebastian Dieterich, Zurich University of Applied Sciences, Switzerland;

This paper describes a concept of teaching writing based on process approach such as is common in L1 contexts, but in this case connected with elements from German as a Second Language teaching. The concept, which should offer the teacher a new understanding of writing and respond to the needs of apprentices with linguistically diverse backgrounds and biographies at vocational schools, was evaluated in an intervention study. Significant positive changes in writing competence of the experimental group were found after four months of intervention. Using further qualitative and quantitative data analysis the authors try to determine what exactly brought the change and to examine the relations between writing competence and motivational and psychological factors.

ëTest in Swedish for Universities (TISUS)í: On the use of conversation as an oral proficiency test

Conversation/ Discourse analysis,Qualitative methods,Second language acquisition,Peer interaction,Language (Foreign and second)

Per Simfors, Linkoping University, Sweden; Ali Reza Majlezi, Linkoping University, Sweden;

The current paper presents results from an investigation of interaction between the examiners of TISUS (Test in Swedish for Universities and Higher Education), and test takers during their oral proficiency assessment of Swedish as a second language. More specifically, the study deals with the interactional procedure of the test, which is usually carried out in a group of two or three test takers. Even though the test takers are informed beforehand about the topics discussed during the exam, within such tests, various questions and topics are also exchanged that may change the trajectory of the talk and impact the test takersí performances as well. The encouragement of keeping the conversation natural between the test takers may be constrained by the formal nature of the test, i.e. the distribution of topics and turns by the examiners. Furthermore, due to the contingencies of talk-in-interaction and co-construction of the context, participants are faced with many challenges. In this presentation, we will demonstrate, by means of conversation analysis, how participants orient to problems related to the fact that the test is neither totally natural, nor is it open-ended. The test takersí preparation for thematic talk may, for example, lead to ëmediated turn distributionsí, which in turn, negatively affects the performances and also the administration of the test situation. The results show that despite the possible benefits of having

conversation as a test situation, problems arise in interaction; thus, assessing the test takersí performance, such interactional context and its construction may be taken into account.

The impact of language promoting programs and approaches in German pre-schools: A meta-analysis

Meta-analysis,Quantitative methods,At-risk students,Language (Foreign and second),Language (L1/Standard Language),Early childhood education

Franziska Egert, University of Applied Science Esslingen, Germany; Michaela Hopf, German Youth Insitute, Germany;

Over the last decades, several efforts had been made to foster language acquisition and development and of young children in early education settings in Germany. However, the results from evaluated programs and approaches are inconsistent. The research project aims on the identification of beneficial programs through a systematic review procedure and meta-analytic techniques. The review consists of (quasi-)experimental studies that evaluate language promoting programs and alternative strategies to foster German language as a first and second language of one to six year old children in German preschools. Electronic search (FIS, WISO, Psyndex) and hand search in renowned journals from 2000 to 2013 last in 3840 hits. After title and abstract screening by two independent coders, the full text of 109 studies was coded. Overall, 25 studies provide sufficient data for meta-analysis. Thereof, 13 studies examine the impact of structured programs and 12 studies of integrated approaches. A weighted randomized multi-level procedure was used to aggregate the overall effect and treatment effects. The aggregation of effect sizes per treatment show a great variability ranging from negative to positive impact. Moderator analysis showed that treatment effects were dependent on methodological quality and age of children. In particular, language promoting approaches for children 3 years and younger were more effective than programs for older children. The results show that some beneficial programs exist. However, more research is needed to investigate heterogeneity of studies and the moderating role of implementation process and fidelity.

H 10

27 August 2015 13:45 - 15:15

Room Yellow_G2

Paper Presentation

Language education

Language education

Keywords: Teacher professional development,Literacy,Parental involvement in learning,Interdisciplinary,Language (L1/Standard Language),Primary education,Qualitative methods,Teaching/instruction,Argumentation,Writing/Literacy,Secondary education,Design

based research,Assessment methods and tools,Second language acquisition,Reflection,Language (Foreign and second)

Sig's: SIG 11 - Teaching and Teacher Education,SIG 12 - Writing,SIG 14 - Learning and Professional Development

Chairperson: Julia Karbach, Goethe-Universitat Frankfurt, Germany

For the love of reading: Empowering learners and communities

Teacher professional development,Literacy,Parental involvement in learning,Interdisciplinary,Language (L1/Standard Language),Primary education

Charalambos Vrasidas, CARDET - University of Nicosia , Cyprus; CARDET Team, CARDET, Cyprus; Maria Solomou, Cyprus University of Technology, Cyprus;

This paper is informed from findings from a large scale initiative with title ìRedefining Literaciesî, managed by CARDET. The focus of the paper is a rich case study that examines the implementation of a whole school reading promotion program with emphasis on reading for pleasure. Based on the Framework, CARDET and a school collaborated to develop and implement a whole-school reading promotion programme. Using Design based research method, the general aim was to improve childrenís reading habits and attitudes, through the development of a reading culture and the formation of reading communities. The program empowered teachers to appreciate workshops that lead to concrete outcomes and had immediate results and meaning for their everyday practices. Teachers recognize that some of the targeted areas and planned activities could be more effectively and vigorously pursued. At the same time, they seem to think that some of the set objectives were not achieved because their plan was over-ambitious and excessive to begin with. Lack of time and curricular pressures were offered as factors that held some individual teachers, or the school as a whole, back from achieving more.

Written argumentation - online and off

Qualitative methods,Teaching/instruction,Argumentation,Language (L1/Standard Language),Writing/Literacy,Secondary education

Hege Myklebust, Stord/Haugesund University College, Norway;

The aim of this study is to see how adolescents argue for their views while writing to different audiences ñ in this case the audiences in question are the teacher and the open public online. In this text analysis study I look at how 16-17 year old students construct their argumentation when writing argumentative texts in an open, online discussion forum, compared to when they write to the teacher alone. To analyze the argumentation in the student texts, I use Stephen Toulminís argumentation model, in which each argument contains a claim, and warrant and data for this claim. It may also contain backing, qualifiers and conditions of rebuttal. To categorize the argument types, I use Jorgensen and Onsbergs book Praktisk argumentation (practical argumentation), which is based on Toulmin. When writing to the open public online, the students

use more of the motivational arguments with emotional appeal. When writing to the teacher, the students use more of the arguments with intellectual appeal. When they do use emotional appeal in the teacher texts, they tend to argue on the basis of authority rather than motivation. The students also more often use data like statistics and facts collected from external sources when writing to the teacher, than when they write to the open public. Based on the knowledge about how the students construct their arguments, we might be able to develop a way of teaching argument that might strengthen the studentsí argument writing, both in school and in their spare time.

Designed based research at secondary school: Reflection in ESL by means of learning diaries

Design based research,Assessment methods and tools,Second language acquisition,Reflection,Language (Foreign and second)

Nuria de Salvador, Universidad de Barcelona, Spain; Ana Remesal-Ortiz, Universidad de Barcelona, Spain; Maria Jose Rochera, University of Barcelona, Spain; Liliana L. Moreno, Universidad de Barcelona, Spain; Nuria de Juan, Universidad de Barcelona, Spain;

We present a study of designed based research at secondary school focusing on the use of learning diaries to promote a better learning of ESL, and more specifically aiming at the improvement of the writing competence. During two academic courses, the research has been carried out following this practice-based, recursive method. An instructional design with a very detailed assessment program was developed by the teacher in her classroom of 21 10th graders. The students performed writing activities in a wiki space which was public for the whole class; additionally they used a learning diary template to reflect on their learning process. The analysis of the implementation in the first year of the study allowed the teacher to review the conditions of her assessment program, and gave support for theoretically- and also evidence-based changes in these practices, with the purpose of enhancing studentsí reflection on their own learning process. These changes included a redesign of the learning diary template and the conditions of realization, plus the shift from a public wiki space for the whole class to a more private space shared only among groups of three students.

H 11

27 August 2015 13:45 - 15:15

Room Green_A5

Paper Presentation

Learning disabilities and special education

Learning disabilities and special education

Keywords: Mixed-method research,Special education,Learning disabilities,Social sciences,Primary education,Cooperative/collaborative learning,Case studies,Cultural diversity in school,Educational policy,Parental involvement in learning,Social interaction,Quantitative methods,At-risk students,Numeracy,Early childhood education,Student learning,Mathematics,Multicultural education

Sig's: SIG 15 - Special Educational Needs,SIG 21 - Learning and Teaching in Culturally Diverse Settings

Chairperson: Risto Hotulainen, University of Helsinki, Finland

Inclusive education in Switzerland

Mixed-method research,Special education,Learning disabilities,Social sciences,Primary education,Cooperative/collaborative learning

Reto Luder, Zurich University of Teacher Education, Switzerland; Andre Kunz, Zurich University of Teacher Education, Switzerland; Anna Jossi, PH Zurich, Switzerland; Ariane Paccaud, PH Zurich, Switzerland;

At present, school systems in most states of Switzerland are shifting towards inclusive support for children with special educational needs. In this situation, it is crucial to know more about the ways and methods of inclusive support in practice and their effects. In this study, the following research questions are answered: 1) What situations and problems lead to special educational needs and subsequently to inclusive support? 2) How is this support planned, what methods are used to support the children, how are the effects of this support evaluated and what ways of cooperation have school teams found to provide this support? 3) What are the effects of this inclusive support in the domains of language and mathematics for the children? The study conducts a longitudinal design (2014-2016) with combination of quantitative and qualitative research methods, ranging from standardized tests to questionnaires, interviews and document analysis. 200 schools in Switzerland will be part of the study. Individual education plans (IEP) from approximately 1000 pupils will be analysed. The results will provide knowledge about the practice of inclusive support for children with special educational needs and show ways for further development of this practice. In this paper session, results from the first data collection (t0) are presented and discussed, focusing on team cooperation for individual educational planning (IEP) in inclusive schools. The IEP-Process includes several steps where analyzing, reflecting and evaluating are an important part within the inclusive support.

ëHave you seen my son?í The accounts of two mothers with deaf sons in mainstream school

Case studies,Cultural diversity in school,Educational policy,Parental involvement in learning,Social interaction

Ines Borges, Universidade Nova de Lisboa, Faculdade de Ciencias e Tecnologia, Portugal; Margarida Cesar, Univerdidade de Lisboa, Portugal; Jose Manuel Matos, Universidade Nova de

Lisboa, Faculdade de Ciencias e Tecnologia, Unidade de Investigacao Educacao e Desenvolvimento, Portugal;

Despite the change in educational policy documents that assume the inclusive principles (ME, 2008; UNESCO, 1994), students who need specialised educational supports still face inequity and exclusion (Cesar & Ainscow, 2006), particularly deaf students. Fostering the transition between home and school cultures is essential to facilitate studentsí access to achievement and to legitimate participation (Lave & Wenger, 1991). Studentsí families are an important source of information for teachers and other educational agents. Knowing studentsí needs, characteristics, and preferential communication language allows for developing more adequate learning experiences, facilitating their legitimate participation (Borges, Cesar, & Matos, 2012). We assumed an interpretative approach (Denzin, 2002) and developed two intrinsic case studies (Stake, 1995), one for each deaf student. The participants were these deaf students, their mothers, teachers, and classmates. Data collecting instruments were interviews, observation, informal conversations, studentsí protocols and documents. We used a narrative content analysis (Clandinin & Connelli, 1998). The results illuminate how these deaf studentsí mothers lived some adaptations made throughout their sonsí life trajectories of participation, particularly in school and until the 12th grade (Cesar, 2013). We also stress the accounts about the interactions between these mothers and the educational agents from the schools attended by their sons. These interactions were few and of little substance. They met teachers mostly to be informed about marks or paperwork, illuminating a distance between home and school that delays the construction of a more inclusive school. Despite that, these deaf students were included as teenagers and students among their peers.

Early number skill development throughout a kindergarten year: Evidence from three assessment points

Quantitative methods,Special education,At-risk students,Learning disabilities,Numeracy,Early childhood education

Jonna Salminen, University of Jyvaskyla, Finland; Tuire Koponen, Niilo Maki Institute, Finland; Asko Tolvanen, University of Jyvaskyla, Finland;

The Matthew-effect (i.e. rich get richer, poor get poorer) is a well-known phenomenon in early number skill development when proceeding from kindergarten to later primary grade levels. This calls for a necessity to develop effective, early intervention tools. For this purpose, we need more knowledge of the early number skill development. The current study had two aims: whether there are different developmental trajectories in early number skills over the kindergarten year and (if so), whether age or gender would predict belonging at a certain profile group throughout the pre-educational semester. The parameters of the models were estimated using the full information maximum likelihood estimation with robust standard errors (MLR). Latent class analysis (LCA) was used to empirically identify groups with different developmental trajectories within 440 Finnish kindergarteners. Based on three assessment points (altogether 13 different latent factors), the results revealed three types of developmental trajectories throughout the kindergarten year: one profile group consisted of the high average (42 %), the other one of the low average (43 %), and the third one of the weakest (15 %) performing children. The results

revealed a statistically significant difference between the low average and the weakest performing children in 12 of the 13 latent skill-variables throughout the kindergarten year. Concerning the weakest performing children the findings support that there is a need for acute, pre-educational support and systematic progress monitoring on several early number sub-skills that are number knowledge, number concept, ordering, exact comparison, verbal counting, non-verbal calculation and story problem solving skills.

Crafting inclusion, empowerment and participation of blind and deaf students

Cultural diversity in school,Student learning,Mathematics,Multicultural education

Claudia Ventura, Universidade Nova de Lisboa, Portugal; Ines Borges, Universidade Nova de Lisboa, Faculdade de Ciencias e Tecnologia, Portugal; Margarida Cesar, Univerdidade de Lisboa, Portugal;

The way power is distributed shapes studentsí access to legitimate participation and to school and social inclusion (Cesar, 2014; Lave & Wenger, 1991). Despite the change in educational policy documents towards the inclusive principles (Ainscow & Cesar, 2006), students who need specialised educational and social supports still experience exclusion and inequity. Blind and deaf students face common and differentiated barriers. Their communication in school is shaped by their sensorial characteristics. Thus, learning illuminates the need to develop shared symbolic systems (Vygotsky, 1934/1962). Based on data from the Interaction and Knowledge (IK) project, we analyse blind and deaf studentsí learning experiences. We assume an interpretative approach (Denzin, 2002) and used two research designs: (1) action-research (Mason, 2002); and (2) case studies (Stake, 1995). This allowed us to confront practices developed by teacher/researchers (1) and teachers who did not participate in the IK (2). The participants were students, teachers, teacher/researchers, families, and psychologists. The data collecting instruments included observation, questionnaires, interviews, informal conversations, reports, tasks inspired in projective techniques, an instrument to evaluate studentsí abilities and competencies, and studentsí protocols. Data treatment used a narrative content analysis (Clandinin & Connelly, 1998). The results illuminate barriers in learning and inclusion processes and what facilitates overcoming them, differentiating the needs of blind students, deaf who communicate in Portuguese Sign Language (PSL) and those who use Portuguese Language (PL). We highlight the importance of the inter-empowerment mechanisms (Cesar, 2013) but also barriers related to legislation and to their life trajectories of participation (Cesar, 2013, 2014).

H 12

27 August 2015 13:45 - 15:15

Room Green_A6

Paper Presentation

Mathematics education

Mathematics education

Keywords: Mixed-method research,Student learning,Problem solving,Mathematics,Primary education,Problem-based learning,Experimental studies,Misconceptions,Early childhood education,Assessment methods and tools

Sig's: SIG 1 - Assessment and Evaluation,SIG 18 - Educational Effectiveness,SIG 27 - Online Measures of Learning Processes

Chairperson: Ilona Friso-van den Bos, Utrecht University, Netherlands

Training of primary school kidsí representational skills in solving difficult word problems

Mixed-method research,Student learning,Problem solving,Mathematics,Primary education,Problem-based learning

Nina Sturm, University Landau, Germany;

A current study (Hohn, 2012) shows that word problems in mathematics lessons are not satisfactorily solved across all grades. It is difficult for most students seeing this kind of problem for the first time to convert the words into a mathematical sentence. From a psychological point of view, using external forms of representation can relieve the working memory and generate capacity for individual, creative thinking processes (Schnotz, Baadte, Muller, & Rasch, 2010). Based on this theoretical background, a training program for three grade pupils was developed and implemented in order to foster the use of external forms of representation for solving word problems in regular classroom settings. It aims to determine whether the training program helps learners to develop their own representations, implement them to find solutions and transfer them to other contexts. In addition, the between-subject design investigates whether communicative settings have positive effects on problem-solving competences and/or finding solutions. The initial findings indicate that the training program can help learners to develop self-generated forms of representation to solve word problems.

Exploring what eye tracking can reveal about student processing of mathematics tasks

Experimental studies,Misconceptions,Mathematics,Early childhood education,Primary education

Sonia White, Queensland University of Technology, Australia; Joanne Wood, Queensland University of Technology, Australia; Alexander Black, Queensland University of Technology, Australia; Geoff Sampson, Deakin University, Australia;

Visual acuity and developing visual processing skills are inherent expectations in mainstream classrooms. Australian teachers cannot assume their students have had a vision assessment by an optometrist prior to commencing formal schooling. Uncorrected visual impairment and/or visual processing difficulties can adversely influence learning and educational outcomes. The neurological or environmental bases of slower than anticipated visual processing skill development are not necessarily known. This presentation reports a pilot study conducted by

education and optometry researchers and combined vision assessment and eye tracking technology to shed light on the strategies (functional visual processes) utilised in a series of mathematics tasks. The Year 3 children (n = 119) demonstrated a range of visual processing behaviours (in the form of fixations, re-fixations and saccades) that have proven insightful particularly for understanding student misconceptions in mathematics tasks. This presentation will use real-time eye tracking data to demonstrate a potential mechanism for understanding learner processes. Findings arising from this study will inform targeted instructional programs that can support childrenís learning.

Beyond grades: diagnostic assessment of mathematics in year 3

Assessment methods and tools,Misconceptions,Mathematics,Primary education

Floor Scheltens, Cito, Netherlands; Anton Beguin, Cito , Netherlands;

This validation study describes the development of a diagnostic instrument for proficiency in subtraction aiming at grade 3 students in the Netherlands. In this phase of the curriculum it is not only important for teachers to know which items are answered incorrectly, but also to identify underlying problems of students. The proposed diagnostic procedure facilitates this and allows for more detailed reporting of the studentsí performance. The diagnostic instrument was designed as an add-on to a pupil monitoring test (LVS) administered at the end of grade 2. 585 grade 3 students participated in this study. The total process contained two stages forming hypotheses and verification of the hypothesis. Based on the results of the subtraction items in the LVS-test, hypotheses were formed about the stage of performance of the student and potential misconceptions and students were attributed to five groups: few error students, other error students, counting error-students, borrowing error-students and overall error-students. Subsequently, they were administered an add-on test aiming at their potential performance level and potential misconceptions. Preliminary results showed that performance of students on the add-on items was in line with the hypotheses formed based on the LVS test.

H 13

27 August 2015 13:45 - 15:15

Room Brown_B3

Paper Presentation

Motivation

Motivation

Keywords: Quantitative methods,Student learning,Achievement,Emotion and cognition,Higher education,Teaching/instruction,Interdisciplinary,Self-regulation,Motivation and emotion,Attitudes and beliefs,Peer interaction,Secondary education

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 13 - Moral and Democratic Education,SIG 4 - Higher Education

Chairperson: Age Diseth, University of Bergen , Norway

ìTo skipî or ìskip toî class: The mediating role of class attendance

Quantitative methods,Student learning,Achievement,Emotion and cognition,Higher education

Luke K. Fryer, University of Sydney, Japan; Paul Ginns, University of Sydney, Australia;

Background While the necessity of class attendance within higher education is widely discussed, its associations with higher education learning processes and outcomes has seen scant longitudinal modeling. A recent meta-analysis (Crede, Roch, & Kieszczynka, 2010) has, however, proposed three potential means of modeling relations between attendance, individual differences and achievement. Aims Test a mediated model of amotivation, class attendance and achievement. Methods Employing simultaneous structural equation modeling and accounting for prior proficiency and self-concept, the current study tested the proposed model in the context of a foreign language learning course context (second year students: n = 304), across four time points in one academic year. Results and Discussion Modeling indicated that in the current context, attendance completely mediated all significant predictive effects of individual differences in motivation on future classroom achievement. While attendance was not a significant predictor of future proficiency, ability belief deficits had a strong predictive effect. Conclusions Findings suggested that the reasons why students do not study have a strongly contrasting predictive effect on their class attendance. Students with ability belief deficits are more likely to go to class while students experiencing effort belief deficits are less likely. These results indicate that it is not whether students face deficits in motivation or not, it is the nature of the deficits that matters. Depending on the outcome examined (future proficiency or classroom achievement) the current study supports both a common cause (motivation) and a mediated model of the lagged relationship between individual differences, class attendance and learning outcomes.

Transformational teaching in higher education: Fostering student engagement and creativity

Quantitative methods,Teaching/instruction,Emotion and cognition,Interdisciplinary,Higher education

Daniela Pachler, Ludwig-Maximilians-Universitat (LMU), Germany; Angela Kuonath, Ludwig Maximilians University Munich, Germany; Julia Specht, Ludwig Maximilians University Munich, Germany; Silke Weisweiler, Ludwig Maximilians University Munich, Germany; Dieter Frey, Ludwig Maximilians University Munich, Germany;

The present study builds on the theme of the EARLI 2015 conference by investigating transformational teaching (Slavich & Zimbardo, 2012) ñ a construct derived from transformational leadership - as a teaching style that promotes creative and innovative thinking. We focus on the effects of transformational teaching on student engagement and creativity.

Derived from literature on transformational leadership (Braun, Peus, Weisweiler, & Frey, 2013) and on previous studies underlining the importance of emotions (Ainley & Ainley, 2011), we further expect trust and achievement emotions as mediating mechanisms in both associations. We collected data in a longitudinal online study among 93 students from 16 faculties of a large German university with well-established scales. As expected, data analysis showed that transformational teaching predicted both perceived student engagement and student creativity. Multiple mediation models (Hayes, 2013) further confirmed our hypothesis of an indirect effect from transformational teaching on student engagement both via trust in teacher (c = .14, CI [.06; .28]) and positive achievement emotions (c = .37, CI [.21; .57]). Concerning student creativity, results confirmed a mediation via positive achievement emotions (c = .22, CI [.09; .40]) but not via trust (c = .05, CI [-.07; .25]). Our study is the first to examine the concept of transformational teaching in the context of higher education. Results demonstrate that the positive effects found on studentsí motivation and creative thinking go beyond the effects of traditional teaching styles (i.e. student-centered approach) and also seem to be an effective teaching style over a broad variety of disciplines.

College students' academic motivation, media engagement and fear of missing out

Quantitative methods,Student learning,Self-regulation,Motivation and emotion

Dorit Alt, Kinneret College on the Sea of Galilee, Israel;

The concerns about the consequences of mental problems related to use of social media among university students have recently raised consciousness about a relatively new phenomenon termed Fear of Missing (FoMO). Drawing on the self-determination theory and on the assumption that low levels of basic need satisfaction may relate to FoMO and social media engagement, the aim of the present research was to examine for the first time possible links between FoMO, social media engagement, and three motivational constructs: Intrinsic, extrinsic and amotivation for learning. Data were gathered from 296 undergraduate social science students by using the following scales: Social Media Engagement (SME), Fear of Missing Out (FoMOs) and Academic Motivation. With the dearth of empirical tools, the SME scale was developed for the purposes of the current study in three steps. The first step included collecting statements from 54 college students who were asked to describe media activities they are engaged with during classes. In the second step, duplicates and irrelevant statements were omitted. The rest were analyzed by three raters. The results foregrounded three categories: Social engagement, news information engagement and commercial information engagement. The third quantitative phase was used to validate the developed questionnaire and to examine the postulated links between the variables. Path analysis results indicated that the positive links between extrinsic motivation and amotivation for learning and social media engagement are more likely to be mediated by FoMO. Interpretations of these results are discussed.

Enhancing competence beliefs, utility value and intrinsic motivation for collaborative learning

Quantitative methods,Attitudes and beliefs,Peer interaction,Secondary education,Motivation and emotion

Nadira Saab, Leiden University, Netherlands; Ron Pat-El, Open University, Netherlands; Coleta Valkenburg, Leiden University, Netherlands;

Motivation for collaboration is an important condition for an effective collaborative process. However, not all students are motivated to collaborate. Both feelings of competence and perceptions of utility can positively influence intrinsic motivation. In this study, we developed an intervention to enhance feelings of competence, perceptions of utility and intrinsic motivation for collaborative learning. Students watched a video where peers explain the utility of collaborative learning and show how effective collaboration takes place. We examined whether the intervention increased feelings of competence, perceptions of utility and intrinsic motivation for collaborative learning. This study involved 171 students from four schools in the Netherlands: two schools with secondary pre-vocational education (vmbo) and two schools with general (havo) and pre-university education (vwo). The age of the students ranged from 11 to 14 years. In every class students were randomly assigned to a control and an experimental group. A SEM approach was used for the evaluation of the pre-post intervention effects. Latent change (i.e. difference scores) was modelled. In line what we expected we found that watching peers model and explain the utility of collaborative learning positively affect perceptions of utility. Furthermore, the effect of the intervention on intrinsic motivation for collaborative learning was fully mediated by increased perceptions of utility. However, watching this video had no effect on feelings of competence. It is possible that not all students could identify themselves fully with the peers in the video.

H 14

27 August 2015 13:45 - 15:15

Room Brown_B6

Paper Presentation

Motivation

Motivation

Keywords: Psychometrics,Quantitative methods,Pre-service teacher education,Higher education,Achievement,Goal orientation,Motivation and emotion,Student learning,Secondary education,Assessment methods and tools

Sig's: SIG 1 - Assessment and Evaluation,SIG 11 - Teaching and Teacher Education,SIG 8 - Motivation and Emotion

Chairperson: Niels Dohn, Aarhus University, Denmark

Choosing to teach: Measuring motivations to teach in Norway

Psychometrics,Quantitative methods,Pre-service teacher education,Higher education

Katrine Nesje, University of Oslo, Norway; Christian Brandmo, University of Oslo, Norway; Jean-Louis Berger, Swiss Federal Institute for Vocational Eduation and Training (SFIVET), Switzerland;

Newly qualified teachers leaving the profession during their first five years in service is creating a growing demand for qualified teachers, both in Norway and internationally. To meet recruitment difficulties, there is a need for further knowledge of prospective teachers' career motivations. The aim of the current study was to validate a Norwegian translation of the Factors Influencing Teaching (FIT) choice scale. Using a sample of 635 pre-service Norwegian teachers, we conducted tests of dimensionality, reliability and convergent and divergent validity. Overall, the analyses revealed that, following two minor changes, the Norwegian version of the scale had sufficient construct validity. . This validation study contributes to the field by providing opportunities for further comparative research on teacher motivation, both within Norway and internationally. In addition, the study provides new knowledge of pre-service Norwegian teachersí career motivations. In line with previous studies using the FIT-choice scale, our results show that the self-perception of teaching-related abilities is one of the main motivational sources, together with an interest in teaching, a desire to work with children and adolecsents and a desire to contribute to society.

10 years after: The long time predictions of achievement goal orientations on academic outcomes

Quantitative methods,Achievement,Goal orientation,Higher education,Motivation and emotion

Antti-Tuomas Pulkka, National Defence University, Finland; Markku Niemivirta, University of Helsinki, Finland; Tapio Auvinen, Aalto University, Finland; Lauri Malmi, Aalto University, Finland;

The purpose of this study was to examine how university studentsí achievement and other study-related outcomes (e.g., graduation time and credit income) vary as a function of their achievement goal orientations. Participants (n=267) were classified into groups according to their goal orientation profiles, and then compared to each other in terms of their achievement and studying indicators. The identified goal orientation groups (mastery-oriented, performance-oriented, avoidance-oriented, and indifferent) differed in the number of periods present, average credits per period, average grade, thesis grade, and in the number of failed courses and credits. Mastery-oriented and performance-oriented students displayed a more adaptive pattern of long-term outcomes when compared to the other two groups. The findings will be discussed in terms of the fit between studentsí motivational dispositions and study demands, and the role instructional practices play in that.

Various motivational and well-being routes to math performance: Findings from the Finnish PISA 2012

Quantitative methods,Student learning,Achievement,Goal orientation,Secondary education,Motivation and emotion

Heta Tuominen-Soini, University of Helsinki, Finland; Katariina Salmela-Aro, Helsinki Collegium for Advanced Studies, Finland; Markku Niemivirta, University of Helsinki, Finland;

International comparisons suggest that Finnish youth are doing well when it comes to academic attainment. Further, based on the PISA 2012, Finnish studentsí motivation and the attitudes to studying and learning mathematics were among the factors that account for variation in student performance in mathematics more so than in the OECD on average. In this study, we explored the various motivational and well-being routes to mathematics performance among Finnish 15-year-olds. The aim was to investigate the predictive relations between studentsí achievement goal orientations, schoolwork engagement, exhaustion at school, interest in math, self-efficacy in math, math-related anxiety, and performance in mathematics. The data came from the Finnish PISA 2012 assessment and the participants were 8829 students. A structural equation model was estimated to analyze the predictive effects between the constructs. We identified different predictive routes to mathematics performance. The findings implied that mastery-intrinsic orientation creates an adaptive framework within which students engage in school and perceive tasks as interesting. Mastery-extrinsic orientation was associated with low anxiety and high math performance, thus reflecting another adaptive route. Performance-approach orientation, also, predicted higher math performance, but through engagement and self-efficacy. In addition, two sets of less positive predictions were detected: performance-avoidance orientation seemed to create a maladaptive route to exhaustion, anxiety, and inferior math performance, while avoidance orientation was associated with low engagement and low interest. These findings can be utilized to set up study designs and hypotheses in future longitudinal research aiming to capture the complex developmental dynamics between motivation, well-being, and performance.

A review on the impact of assessment on learner motivation

Assessment methods and tools,Goal orientation,Motivation and emotion

Renske de Kleijn, Utrecht University, Netherlands; Frans Prins, Utrecht University, Netherlands; Christel Lutz, University College Utrecht, Netherlands; Johannes van Tartwijk, Utrecht University, Netherlands;

The aim of this review study was to examine the impact of assessment on motivation for different student populations. Three assessment characteristics were explicitly addressed and investigated in relation to learner motivation: assessment function, assessor, and the way the result of the assessment is communicated to the learner. The self-determination theory (SDT) of Deci and Ryan (2000) was used for understanding and conceptualizing motivation. We used databases ERIC and PsychInfo with key words concerning assessment and motivation. 105 studies with 353 relations were included in this review study. In contrast to what was expected based on the findings of Deci and Ryan (2000) very few negative effects on intrinsic motivation were found in the reviewed papers. Positive effects were mainly found for extrinsic motivation and hardly for intrinsic motivation. With respect to how motivation was measured, the results of studies measuring behavior deviate from attitude measures. The implications of this review study for assessment practices in educational context and an agenda for future research will be addressed.

H 15

27 August 2015 13:45 - 15:15

Room Cyan_F1

Paper Presentation

Peer interaction

Peer interaction

Keywords: Argumentation,Peer interaction,Self-regulation,Higher education,Video analysis,Student learning,Science education,Computer-supported collaborative learning,Experimental studies,Quantitative methods,At-risk students,Secondary education,Mixed-method research,Cultural diversity in school,Social interaction,Communities of learners

Sig's: SIG 1 - Assessment and Evaluation,SIG 12 - Writing,SIG 15 - Special Educational Needs,SIG 21 - Learning and Teaching in Culturally Diverse Settings

Chairperson: Antje von Suchodoletz, New York University Abu Dhabi, United Arab Emirates

Teaching writing to learn in higher education

Argumentation,Peer interaction,Self-regulation,Higher education

Marta Pardo Estruch, Universitat Ramon Llull, Spain; Montserrat Castello , Universitat Ramon Llull, Spain;

In this research we have developed and evaluated an intervention based on the use of writing as an epistemic tool that enables learning through guidance and collaborative review of the composition process. We adopted an interpretative-correlational design in which we: a) analyzed the impact of different collaborative review processes on final text quality; b) established a relationship between profiles of writers and reviewers and final text quality; c) analyzed the studentís degree of satisfaction. Participants in the research were students of 3rd year of Psychology. The intervention was conducted in 2009-2010 and was divided into two parts: a) features of positioning text and b) composition and review of a text. Some specific instruments were developed to assess final text quality (assessment grid), composition and revision strategies and studentís satisfaction (questionnaire). Revision strategies were analysed qualitatively (type, relevance and impact) and quantitatively (number of accepted relevant suggestions, ratio of changes). The collected data were analyzed using SPSS. Results confirm the epistemic potential of writing and highlight collaborative reviewing as a useful way to learn to write and as a means for learning the content of a discipline. They also show differences in the composition process that allow us to establish the existence of profiles of both writers and reviewers, who demonstrate different composition and revision strategies and, consequently, different ways of

dealing with composition process. Finally, we offer some recommendations for using writing as an epistemic tool, and proposals to train both teachers and students in the use of this tool.

Examining peer assessorsí behavioural profiles in a web-based peer assessment science context

Video analysis,Student learning,Peer interaction,Science education,Higher education,Computer-supported collaborative learning

Olia Tsivitanidou, University of Applied Sciences and Arts Northwestern Switzerland FHNW , Switzerland;

In this study we aimed at examining studentsí behavioral profiles when undertaking the peer-assessor role in a web-based reciprocal peer-assessment context and whether these profiles relate with their learning gains in an inquiry-based science learning environment. The study was implemented in the context of reciprocal online peer-assessment of web-portfolios in a higher education science course. The participants, 26 undergraduate student teachers, anonymously assessed each other's science web-portfolios, while studying teaching material on ecosystems. The findings showed that two main assessor profiles emerged from studentsí typical responses during the peer-assessment procedure. The distinction factor among the two profiles was the self-invented heuristics that students used when undertaking the assessor role; explicitly, students in profile1 (N=21) gave feedback to peers without using any other external information resource, besides what they remembered when developing their own portfolio, whereas in profile2 (N=5) students used such information resources systematically, especially their own portfolio/artifacts. However, further analyses of studentsí tests and quality of artifacts, revealed no statistically significant difference in learning gains between the two peer assessorsí profiles. Even though the learning gains were the same, the different heuristics used by the two groups of students resulted in the production of feedback of different quality. Overall, this is an area of high interest, if we consider the fact that students nowadays become more and more familiar with various web-based platforms, which could easily be used by teachers in a classroom setting in order to incorporate innovative and formative assessment approaches in their teaching setting, such as peer-assessment.

Well being of pupils in pre-vocational secondary education: The influence of the Good Behavior Game

Experimental studies,Quantitative methods,At-risk students,Peer interaction,Secondary education

Marieke Meeuwisse, Erasmus University Rotterdam, Netherlands; Willem de Vos, Hogeschool Rotterdam, Netherlands; Luuk van Schie, Risbo, Netherlands; Sabine Severiens, Erasmus University Rotterdam, Netherlands;

In the present study it was investigated whether the Good Behavior Game (GBG; Barrish, Saunders & Wolf, 1969) is beneficial for studentsí wellbeing related to both teachers and peers in prevocational secondary education. The GBG is a well-known example of a classroom-based,

behavior-management program that is conducive to learning for all students . In a quasi-experimental research design the GBG was introduced in 12 classes (experimental condition) and in 13 classes the GBG was not introduced (control condition). In total, 449 pupils completed paper-and-pencil questionnaires measuring their wellbeing related to teachers and their wellbeing related to peers in a pretest (M0) and a posttest (M1) during their first year in secondary education. Multi-level regression analyses showed that playing the GBG positively influenced pupilsí wellbeing related to teachers. Pupilsí wellbeing related to peers appeared not to be affected by playing the GBG. No gender differences were found, indicating that boys do not profit more of playing the GBG than girls as it comes to their wellbeing. Further research is needed in which the GBG is introduced to more teachers in a specific grade level, to investigate a possible increase in the influence of the GBG on pupilsí wellbeing related to both teachers and peers.

Adolescentsí multidimensional homophily in their classroom offline and online friendship

Mixed-method research,Cultural diversity in school,Social interaction,Communities of learners

Shupin Li, University of Turku, Finland; Tuire Palonen, University of Turku, Finland; Erno Lehtinen, University of Turku, Finland; Kai Hakkarainen, University of Turku, Finland;

Socio-digital technologies are transforming adolescentsí learning and development by blurring the boundaries of their offline and online social networks in the ear of Web 2.0. Present paper aims to examine gender and ethnic multidimensional homophily of classroom offline and online (Facebook) friendship networks among grade 7-9 adolescents from a multi-cultural school in Finland. The study relied on mixed-method strategy. The participantsí (N=109, responded rate was 85.16%) gender and ethnic homogenous patterns of friendship were examined by social networking questionnaire (offline and online relations in classrooms). After responding networking questionnaire, six participants were interviewed regarding their personal social network within and beyond school. Correlation between offline and online networks were firstly applied. Exponential random graph models (ERGMs) were employed to examine gender homophily and ethnicity homophily as well as their interaction effects in offline and online classroom friendship network. Content analysis on interview data assisted to investigate such multidimensional homophily in personal network context. The results of the study indicated that adolescentsí offline classroom friendship network is related to their corresponding online connections. There is likely to be gender and ethnicity homophiy effects as well as interaction effects in adolescentsí offline and inline networking practices. Future studies of adolescentsí multidimensional homophily offline and online could include more attributes (e.g. age, socioeconomic status) in extended social network scope (e.g. grade). In addition, homophily feature in adolescentsí virtual communities mediated by various other socio-digital media than Facebook should be investigated.

H 16

27 August 2015 13:45 - 15:15

Room Brown_B8

Paper Presentation

Reading comprehension

Reading comprehension

Keywords: Qualitative methods,Student learning,Comprehension of text and graphics,Science education,Secondary education,Experimental studies,Quantitative methods,Teaching/instruction,Literacy,Reading comprehension,Primary education,Psychometrics,Attitudes and beliefs

Sig's: SIG 1 - Assessment and Evaluation,SIG 2 - Comprehension of Text and Graphics,SIG 6 - Instructional Design

Chairperson: Ulrika Wolff, University of Gothenburg, Sweden

To source or not to source: Ninth graders' concepts about costs and benefits of source evaluations

Qualitative methods,Student learning,Comprehension of text and graphics,Science education,Secondary education

Johanna Paul, University of Munster, Germany; Marc Stadtler, University of Muenster, Germany; Carlotta Marie Limpinsel, Westfalische Wilhelms-Universitat Munster, Germany; Jean-Francois Rouet, Universite de Poitiers, France; Rainer Bromme, Universitat Munster, Germany;

Reading critically on the internet is a crucial skill for high school students, since the internet has become a popular tool to complete school related tasks. With the advantage of broad access to a vast amount of information also comes the challenge of choosing information sources. On the one hand past research revealed that high school students hardly engage in source evaluations in naturalistic tasks (e.g. Britt & Aglinskas, 2002) but on the other hand they master basic sourcing tasks such as identifying source parameters or rating authorsí intentions and expertise (Stadtler, Babiel, Rouet & Bromme, 2014). Possible reasons for studentsí failure to put their source evaluation competencies into action in naturalistic tasks lie yet in the dark. Therefore we conducted an interview study asking 20 ninth grade students about the costs and benefits of sourcing activities. Students first completed a short internet research task on a controversial topic and were then questioned about potential reasons for refraining or engaging in sourcing activities. Qualitative analysis of the interviews suggests that students seem to see potential benefits from sourcing (i.e. evaluating information quality), but also provide reasons to minimize sourcing activities, as for example lack of external prompting or reinforcement in typical school settings. Studentsí concepts about the costs and benefits of sourcing activities can inspire future ideas on how to efficiently foster critical online reading.

Evaluation of an instruction-based intervention fostering ninth gradersí source evaluation skills

Experimental studies,Student learning,Comprehension of text and graphics,Science education,Secondary education

Johanna Paul, University of Munster, Germany; Marc Stadtler, University of Muenster, Germany; Silke Globoschuetz, WWU Muenster, Germany; Jean-Francois Rouet, Universite de Poitiers, France; Rainer Bromme, Universitat Munster, Germany;

Although reading on the internet has become a common task for high school students the challenges of internet queries, as for example the need to choose and evaluate information, are only scarcely addressed in curricula (OECD, 2011). Past research has shown that when it comes to critical reading of multiple documents high school students hardly consider attending to source features as a reading strategy even when they are instructed to do so (e.g. Britt & Aglinskas, 2002). Therefore effective interventions fostering multiple document reading skills are needed. The goal of this study is the evaluation of an instruction-based intervention introducing students to the concept of the division of cognitive labor (Sperber, Clement, Heintz, Mascaro, Mercier, Origgi & Wilson, 2010) on studentsí sourcing activities in a realistic multiple document task. We hypothesized that informing students about the uneven distribution of knowledge between experts and laypersons might help them realize the importance of evaluating sources to decide whom to believe. We found that (in comparison to a control group) students receiving this instruction visited imprint pages more frequently, remembered source-content links better, cited sources more often in an essay and used arguments from a highly reliable source more frequently. We conclude that informing students about the distribution of knowledge in our society can be a fruitful starting point to teach critical multiple document reading.

Influence of monitoring implementation on intervention outcomes: Evaluating a reading programme

Quantitative methods,Teaching/instruction,Literacy,Reading comprehension,Primary education

Susanne Seifert, University of Graz, Austria; Lisa Paleczek, University of Graz, Austria; Susanne Schwab, Bielefeld University, Germany; Barbara Gasteiger-Klicpera, University of Graz, Austria;

According to the PIRLS results, the educational systems in German speaking countries have not been very successful in providing equal opportunities considering learning preconditions. This observation led to the conceptualization and implementation of a reading programme - LARS (Language And Reading Skills). LARS was evaluated regarding its effects on the reading abilities of 2nd and 3rd graders. Three studies were conducted in quasi-experimental pre-post-test-designs including comparison groups (CG). Within each study, the reading programme was conducted twice a week during reading lessons. In study 1, the intervention group (IG) was supported by a project member and the teacher, both implementing the programme together during a short period of time (3 months). The results indicate that children of the IG developed better in fluency and reading comprehension than the CG. In study 2, the programme was implemented during a whole school year by the teacher who was supported intensely by a project member during the first two months. The effects of the intervention were restricted to higher

gains in sentence comprehension. In the third study, the programme was also implemented during a whole school year. A project member supported the teacher, however, less than in study 2. The results in study 3 indicate that only for some children and merely in reading fluency, the intervention was more successful than conventional reading instruction. The results of the three studies support the assumption that the monitoring of implementation can influence the quality of implementation and therefore the results of interventions studies.

An international reading literacy study: Factor structure of the Chinese PIRLS student questionnaire

Psychometrics,Student learning,Attitudes and beliefs,Literacy,Primary education

Wai Ming Cheung, The University of Hong Kong, Hong Kong; Joseph W.I. LAM, The University of Hong Kong, Hong Kong; Doreen W.H. AU, The Hong Kong Polytechnic University, Hong Kong; Hector W. H. TSANG, The Hong Kong Polytechnic University, Hong Kong; Yue Zhu, The University of Hong Kong, Hong Kong;

The student questionnaire (PIRLS-SQ 2011) of the Progress in International Reading Literacy Study (PIRLS) was designed to gather information from students on reading literacy development related to aspects of studentsí self, home and school lives across countries/districts. The questionnaire was translated into different languages for international comparison and research purposes. This study aims to assess the psychometric properties of the Chinese version of the student questionnaire (PIRLSñSQCV 2011) and identify the underlying factor structure using exploratory factor analysis and confirmatory factor analysis among 3875 Chinese fourth-grade students in Hong Kong. A 10-factor structure model has been identified and confirmed to resemble much to the original PIRLS structure. While the similarity allows international comparisons of studies carried out in different places of the world following the PIRLS strategy, the findings add further insights into the inconclusive results in the literature regarding the relationship between student factors and reading achievement.

H 17

27 August 2015 13:45 - 15:15

Room Green_A7

Paper Presentation

Researcher education

Researcher education

Keywords: Qualitative methods,Researcher education,Social sciences,Doctoral education,Lifelong learning,Phenomenography,Higher education,Quantitative methods,Attitudes and beliefs,Writing/Literacy,Motivation and emotion,Cultural psychology,Social interaction,Communities of learners

Sig's: SIG 12 - Writing,SIG 14 - Learning and Professional Development,SIG 24 - Researcher Education and Careers

Chairperson: Kerry Howells, University of Tasmania, Australia

Non-completersí recollections of the process of their doctoral studies

Qualitative methods,Researcher education,Social sciences,Doctoral education,Lifelong learning

Liina Lepp, University of Tartu, Estonia; Marvi Remmik, University of Tartu, Estonia; Ali Leijen, University of Tartu, Estonia;

Recent reforms in higher education have provided material for researching different aspects of doctoral studies in a variety of ways. Much of the current literature concentrates on characteristics of effective supervision and doctoral studentsí experiences. Less attention has been paid to the study experiences of non-completers ñ former doctoral students who dropped out of doctoral programmes prior to graduation. In the current study, we explore the doctoral studies experiences from the perspective of the latter group and aim to identify factors that were related to dropping out. Data were collected with semi-structured interviews from 14 former doctoral students in the field of education and qualitative thematic data analysis techniques were employed for data analysis. The results indicate that dropping out from doctoral studies is associated with a combination of different factors; e.g., (with) studentsí personal factors, supervisory arrangements, as well as factors related to institution and the wider learning environment. These results are further discussed and implications for enhancing study arrangements for doctoral studies are presented.

Organizational support of training: A perception that affects motivation to transfer

Phenomenography,Qualitative methods,Higher education,Lifelong learning

Isabelle Bosset, Universite de Geneve, Switzerland; Etienne Bourgeois, University of Geneva, Switzerland;

Ever since the ´ transfer problem ª was first identified, there is a growing literature regarding the best way to ensure transfer of training. Organizational support of training is frequently mentioned as a defining factor of transfer of training. However, little is know about what is meant by this support, from the learnersí point of view. Four profiles are presented that describe employee evaluation of the organizational support of training received. Specifically, the authors aim to respond to the following questions : What is perceived organizational support of training ? And what role does it play in motivation to transfer, amongst other variables ? The authorsí aim is to enhance understanding of this concept, considered from the point of view of the trainee / employee, and its role in transfer motivation. The overall aim of the study is to show that what counts for transfer is not the actual oganizational support per se, but rather the organizational support as perceived and evaluated by the employees, in light of their needs.

PhD studentsí writing profiles, experienced well-being and perceptions of the learning environment

Quantitative methods,Researcher education,Attitudes and beliefs,Writing/Literacy,Doctoral education,Motivation and emotion

Kirsti Lonka, University of Helsinki, Finland; Elina E. Ketonen, University of Helsinki, Finland; Jenna Vekkaila, University of Helsinki, Finland; Niclas Sandstrom, University of Helsinki, Finland; Kirsi Pyhalto, University of Oulu; University of Helsinki , Finland;

PhD students may enter various conceptions of writing that have consequences for their well-being and productivity. We looked at different writing profiles of PhD students by employing a person-centered approach. Further, we examined the differences between profiles in terms of experienced well-being and perceptions of the learning environment. The participants (n =664) were PhD students from three faculties at the Helsinki University. The Writing Process Questionnaire (Lonka et al., 2014) was used to measure writing conceptions consisted of 6 sub-scales for measuring blocks, procrastination, perfectionism, and innate ability. Well-being was measured with MED NORD (Lonka et al., 2008; Stubb, Pyhalto & Lonka, 2011, 2012): experienced stress, exhaustion, anxiety, and lack of interest. Perceptions of the learning environment were also measured: feedback, workload, satisfaction, poor ambience, and worry (Dahlin et al., 2005). PhD students with similar patterns of writing variables were identified through latent profile analysis (LPA). We used one-way ANOVAs to examine group differences with respect to well-being and learning environment as well as whether participants had considered interrupting their studies. Three writing profiles were identified: Growth-Transforming (51%), Ambivalent (40%), and Fixed-Blocking (9%) groups. Fixed-Blocking group reported lack of interest the most often and they also reported receiving the least feedback. They also most often considered interrupting their studies. Further, Growth-Transforming group were the most and Fixed-Blocking group the least satisfied with their studies. It appeared that epistemologies were most decisive in differentiating among PhD students. Blocks were related to beliefs in innate ability. Educational implications were discussed.

ëThe world is your oysterí: International studentsí doctoral journey

Cultural psychology,Researcher education,Social interaction,Doctoral education,Communities of learners

Dely Elliot, University of Glasgow, United Kingdom; Kate Reid, University of Glasgow, United Kingdom; Vivienne Baumfield, University of Glasgow, United Kingdom;

Our study reports a phenomenological investigation of the PhD academic journey of fourteen highly successful international doctoral students. Study participants are non-British early-career academics who commenced working for a research-intensive British university following their PhD completion. Employing a qualitative approach, with the use of visual metaphors to facilitate photo-elicitation interviews, participants were encouraged to reflect retrospectively on their PhD-related experiences. Coming from different countries of origin and disciplines to pursue several years of doctoral research in different higher education institutions in the UK, studentsí accounts

of their experiences are characterised by numerous albeit typical challenges encountered by anyone undertaking a research-based PhD. However, the sociocultural distinctions between the student sojournersí home and host countries at times caused personal tensions between enculturation (acquisition of first culture) and acculturation (learning of second or additional culture) processes at a personal, academic and societal level, prompting construction, negotiation or re-construction of identity. This twofold complexity of the international PhD journey inevitably poses greater challenges for PhD completion. With the studyís phenomenological focus, an Interpretative Phenomenological Approach (IPA) was employed in the data analysis. Taking the sociocultural psychological notions of ëcommunal selfí and ërelational agencyí as the main theoretical framework, our paper will attempt to demonstrate a concrete synergy between learning and research contexts a) by discussing the implications of our findings, e.g. potential pathways and strategies (relevant to the increasing number of PhD student sojourners and Higher Education Institutions), and b) by theorising the international PhD academic journey.

H 18

27 August 2015 13:45 - 15:15

Room Green_A8

Paper Presentation

Self-efficacy

Self-efficacy

Keywords: Learning and developmental difficulties,Learning disabilities,Peer interaction,Self-efficacy,Social interaction,Secondary education,Mixed-method research,Problem solving,Social sciences,Higher education,Quantitative methods,Emotion and affect,Parental involvement in learning,Primary education,Achievement,Attitudes and beliefs

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 4 - Higher Education,SIG 8 - Motivation and Emotion

Chairperson: Caroline Liberg, Uppsala University, Sweden

The relationship between the self -concept of children with and without learning problems

Learning and developmental difficulties,Learning disabilities,Peer interaction,Self-efficacy,Social interaction,Secondary education

Theodoros Bampilis, University of Groningen, Greece; Alexander Minnaert, University of Groningen, Netherlands;

This study focuses on a comparison of students with and without learning problems in Greek secondary education. In general, self-concept of students and their perceived social support was

found to be of importance for achievement in the first years of secondary education. In literature, less evidence is to be found on the differential effects of these factors for students with and without learning problems. Based on results of two secondary schools in Athens we found significant differences between students with and without learning problems in self-concept (academic, social self-concept) and perceived social support. A differential effect was found for students with and without learning problems and academic versus social self-concept. Literature achievement in secondary schools was predicted significantly by academic self-concept in students without learning problems, while social self-concept was the best predictor for students with learning problems. Social support did not predict literature achievement on top of self-concept in either of these two groups of students. These results suggest that educators should have in mind that students with and without learning problems differ in how they perceive school experiences. For the former, enhancing their social self-concept by socializing and assisting them to make strong friendships, is of crucial value on their literature achievement. For the latter academic self-concept is a key factor to success in literature domain. Therefore educators and educating policies be aware of these differential effects and provide differentiated instruction and support for students with and without learning problems.

Service learning can foster self-efficacy and personal development, but why? A mixed methods study

Mixed-method research,Problem solving,Self-efficacy,Social sciences,Higher education

Karl-Heinz Gerholz, University of Paderborn, Germany; Katrin B. Klingsieck, University of Paderborn, Germany; Verena Liszt, University of Paderborn, Germany;

Service learning can be described as an educational tool that is characterised by students giving service to the community and having a learning experience. Previous research has shown that service learning often promotes social responsibility and citizenship skills among students. However, the existing empirical studies have rather focused on student outcomes than on the instructional design of the service learning-course. The present study fulfills the link between the effect of a service learning-course and the service-activity of the service learning-groups. The results show that effects over time in self-efficacy, self-concept and willingness to be engaged increase as well as differences between service learning-groups exist. Students who described a positive impression of their charity organisation develop a stronger self-efficacy. Being directly confronted with social challenges like poverty supports the students to gain a more reflected self-concept.

Self-perceived scholastic competence: conditional support, sensitivity to errors and test-anxiety

Quantitative methods,Emotion and affect,Parental involvement in learning,Self-efficacy,Primary education

Marine Hascoet, Universite Grenoble Alpes, France; Pascal Pansu, Universite Grenoble Alpes, France; Therese Bouffard, Universite du Quebec a Montreal, Canada;

This paper presents a study conducted with 524 elementary school pupils (aged 9-10 years) and investigates the relationship between their perception of conditional positive and negative support from parents and teachers, and their self-perceived scholastic competence. We tested whether this relationship was mediated by sensitivity to errors and test-anxiety. The pupils filled out a questionnaire on the extent to which they perceived conditional positive and negative support from significant adults and their sensitivity to errors, test-anxiety, and feelings of scholastic competence. The results show that when controlling for conditional positive support, the more the pupils perceived conditional negative support from significant adults, the more they reported high levels of sensitivity to errors and test-anxiety, and the lower was their self-perceived scholastic competence. In contrast, when controlling for the conditional negative support, conditional positive support was not linked to self-perceived scholastic competence. The results confirm the detrimental effect of conditional negative support on the self-perceived scholastic competence.

Effects of reference groups on academic self-concept across transition to lower secondary school

Quantitative methods,Achievement,Attitudes and beliefs,Primary education

Markus Neuenschwander, University of Applied Sciences and Arts Northwestern Switzerland, Switzerland; Edith Niederbacher, University of Applied Sciences and Arts Northwestern Switzerland FHNW, Switzerland; Stephan Rosselet, FHNW School of Education, Switzerland;

Academic self-concept in German and mathematics does not only depend on individual achievement but also on social comparisons with classmates (Big-Fish-Little-Pond Effect) and on temporal comparisons with prior achievement. The present study examines how temporal comparisons and social comparisons of achievement influence academic self-concept for students who remain in primary school from 5th to 6th grade (N=502) in contrast to the students at the same grades who move on to ability-grouped lower secondary school (N=345). Structural equation models were tested for both groups and for German and mathematics. Results show that changes of academic self-concept are caused by current and prior individual and class achievement only for students staying in primary school. When students move on to lower secondary school current individual and class achievement were relevant, but prior achievement and class achievement were not. Consequences of reference group changes in the development of academic self-concept are discussed.

H 19

27 August 2015 13:45 - 15:15

Room Green_A4

Paper Presentation

Teacher professional development

Teacher professional development

Keywords: Case studies,Mentoring in teacher education,Professions and applied sciences,Workplace learning,Lifelong learning,Experimental studies,Quantitative methods,Teacher professional development,Attitudes and beliefs,Mathematics,Primary education,In-service teacher education,Social interaction,Higher education,Mixed-method research,Social sciences

Sig's: SIG 11 - Teaching and Teacher Education,SIG 14 - Learning and Professional Development

Chairperson: Alain Breuleux, McGill University, Canada

Pedagogical solitude and the role of expert teachers in the workplace

Case studies,Mentoring in teacher education,Professions and applied sciences,Workplace learning,Lifelong learning

Eli Gottlieb, Mandel Leadership Institute, Israel; Miriam Ben-Peretz, University of Haifa, Israel;

Mentoring of novice teachers by more experienced colleagues has been identified as an effective way to guide new practitioners into the field. However, little is known (or, to the best of our knowledge, done) about the ongoing mentoring of experienced teachers. This study investigates the mentoring of experts by experts. First, we develop the theoretical concept of expert-expert mentoring; next, we report on an exploratory study we conducted to document and analyze a case of expert-expert mentoring; and finally, we discuss the potential of such mentoring to contribute to the cultivation of schools as workplaces that support teachersí lifelong learning.

Changing teacher expectations to enhance student achievement: An intervention study

Experimental studies,Quantitative methods,Teacher professional development,Attitudes and beliefs,Mathematics,Primary education

Christine Rubie-Davies, University of Auckland, New Zealand; Elizabeth Peterson, University of Auckland, New Zealand; Chris Sibley, University of Auckland, New Zealand; Robert Rosenthal, University of California at Riverside, New Zealand;

This study reports a teacher expectation intervention. Randomly assigned teachers were taught the practices and beliefs of high expectation teachers (those with high expectations for all students) in the areas of grouping and learning activities, enhancing the class climate, and goal setting. Student achievement in mathematics was measured three times during the year. Because of the hierarchical structure of the data, they were analyzed using Bayesian latent growth curve modeling. Teacher engagement with the intervention was also measured. Students with intervention teachers significantly increased their mathematics achievement when compared with students in control teachersí classes. The findings show how teacher beliefs moderate expectancy

effects. They also demonstrate benefits of providing equitable and challenging learning opportunities for the most vulnerable students.

Relational agency: Developing the social side of teacher leadership in a teacher education program

Case studies,In-service teacher education,Social interaction,Higher education

Frank Cornelissen, University of Cambridge, United Kingdom; Alan Daly, University of California, San Diego, United States; Yi-Hwa Liou, University of California San Diego, United States; Rob Riordan, High Tech High, United States; Stacey Caillier, High Tech High, United States; Kelly Wilson, High Tech High, United States; Esther Canrinus, University of Groningen, Netherlands; Katie Sciurba, National University, United States;

Key to the success of teachers leading change efforts is their social capacity to create meaningful relationships with their colleagues; to seek them out for advice and collaboration to jointly improve school practice. This capacity of teachers can be described as their ërelational agencyí. This study explored the way teachers enrolled in an in-service masterís program in the United States were supported in seeking out colleagues for advice and collaboration to improve their school practice. We used social network and interview analysis to investigate changes in personal networksí size and composition of teachers that were enrolled in this program. Overall, program elements were found that contributed to the growth of teachersí personal advice and collaboration networks, but the program did not have a major influence on the composition of these personal networks. Results revealed that not all masterís students benefited from the program in the same way or extent.

Sustainability of teacher professional development

Mixed-method research,Teacher professional development,Social sciences,Primary education

Lisa Gaikhorst, University of Amsterdam, Netherlands; Monique Volman, University of Amsterdam, Netherlands; Jos Beishuizen, VU University Amsterdam, Netherlands; Bonne Zijlstra, University of Amsterdam, Netherlands;

This study investigated whether the positive effects of a professional development programme for urban primary school teachers (ëMasteryí) were observed one year after the programme ended and which characteristics and activities in the schools of the participants contributed to those positive effects. The study included both a quasi-experimental study (N=72) and interviews (N=19). The study showed a significant long term effect of the programme on teachersí competences and professional orientation. The teachers and their principals considered an open culture in the schools, in which the teachers could share their expertise with colleagues and teachers and principals seriously considered their expertise, as the most important factor for the sustainability of the programmeís effects. .

27 August 2015 13:45 - 15:15

Room Blue1_C1

Paper Presentation

Technology-enhanced learning

Technology-enhanced learning

Keywords: Case studies,Educational technology,Teaching/instruction,Out-of-school learning,Computer-assisted learning,Comparative studies,Student learning,Secondary education,Vocational education,Computer-supported collaborative learning,Game-based learning,Qualitative methods,Social aspects of learning,Science education

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 11 - Teaching and Teacher Education,SIG 7 - Learning and Instruction with Computers

Chairperson: Beno Csapo, University of Szeged, Hungary

Clickers in sports education and training: Satisfaction, performance and immediacy

Case studies,Educational technology,Teaching/instruction,Out-of-school learning,Computer-assisted learning

Vaso Constantinou, Cyprus University of Technology, Cyprus; Andri Ioannou, Cyprus University of Technology, Cyprus;

This study examines the use of clickers in the assessment of athletesí understanding of Judo rules and regulations. The study involved a total of 162 Judo athletes. The investigators carried out six assessment sessions, in each of which half of the questions were answered using clickers and half of them were answered using paper-and-pencil. Quantitative data were collected on athletesí performance and attitudes. The trainerís perspective was also examined. Findings suggest that the use of clickers is linked to better satisfaction and performance and is characterized by speed and immediacy while it supports the feedback loop between athletes and trainers.

How do one-to-one technologies impact learning and visualizing-verbalizing styles of school students

Comparative studies,Educational technology,Student learning,Secondary education,Computer-assisted learning

Ina Blau, The Open University of Israel, Israel; Yehuda Peled, Western Galilee Cl. , Israel;

This study explores whether and how the cognitive, emotional and social aspects of students' perceived learning and their learning styles (visualizing and verbalizing) differ between schools

adopting a one-to-one (1X1) technology model (i.e., teacher's laptop used as a whole-class technology and a laptop for each student), compared to the teacher's laptop as a whole-class technology (WCT) only, and the classroom otherwise without technology (WT). The participants were 1106 eight and ninth graders (age 13-15) from three demographically similar secondary schools in Northern Israel. 385 of the participants studied for three years in a 1X1 classroom in School A, 387 learned for the same length of time through a WCT model in School B, and 334 learned WT in School C. An online questionnaire measured different aspects of perceived learning and the visualizing-verbalizing learning styles of students. Both the hypotheses were supported. Cognitive, emotional and social perceived learning was the highest in the 1X1 model and the lowest in learning WT. It seems that all aspects of studentís perceived learning benefited from a 1X1 classroom beyond the WCT model. However, a trade-off was found in student learning styles: learning in the 1X1 model increased student visualization, while their verbalizing decreased. The results emphasize the importance of the research-based decisions of educators and policy-makers.

Collaborative 3D learning games for future learning: teachersí instructional practices

Case studies,Educational technology,Teaching/instruction,Vocational education,Computer-supported collaborative learning,Game-based learning

Raija Hamalainen, University of Jyvaskyla, Finland; Kimmo Oksanen, University of Jyvaskyla, Finland;

Collaborative games will enable new kinds of possibilities for learning. In the future, the goal of game-based learning should be to introduce new ideas and deepen in-depth understanding of learners. However, studies have shown that shared high-level knowledge construction is a challenging process. Moreover, thus far, few empirical studies have examined what constitutes the teacherís role in games. The focus of this paper is to investigate teachersí real-time instructional activities in a scripted 3D game setting. Altogether, 27 vocational students between the ages of 16 and 18 and three teachers took part in the study, making up six groups of five people (N=30, 23 males, 7 females). Our hypothesis is that groups with real-time teacher instruction will come up with more shared knowledge construction that can be considered productive than groups studying without real-time teacher instruction. Thus, content analysis (13,472 utterances) was conducted to compare collaboration processes between different learning conditions. When teachersí and studentsí interactions are mediated by a game, teachers seem to apply different discussion activities to empower vocational learning than they do in traditional classroom settings. In this presentation we will illuminate that the teacher has a special role in empowering collaborative knowledge construction in the 3D game context in vocational education. Our findings show that the teacherís participation in collaborative work helps groups to develop productive ways of providing knowledge and asking contextual questions. In addition, we illustrate the teacherís ability to bring about students in formulating hypotheses, interpreting context, providing explanations, and describing observations.

Exploring the interplay of various support forms in CSCL settings

Qualitative methods,Student learning,Social aspects of learning,Science education,Secondary education,Computer-supported collaborative learning

Irina Engeness, University of Oslo, Norway; Anniken Furberg, University of Oslo, Norway;

This paper reports on a study of studentsí development of conceptual understanding in a computer-supported collaborative learning (CSCL) setting within science education. During the last decades much research has been undertaken in order to scrutinize the way support in form of peer collaboration, task design, teacher intervention or digital tools impact studentsí learning. The review of the studies on support forms revealed their focus on one support form in search for possible effects on studentsí knowledge or inquiry skills acquisition. In naturalistic educational settings, however, various support forms coexist and are intertwined. Hence, understanding of studentsí learning process in the space created by these support forms is important. This study aims to contribute to the existing body of research by providing a deeper insight on the interplay of social and material factors in studentsí learning process. The empirical basis of the study is Science secondary school project in Genetics. Detailed analyses of students and their teacherís interactions within task-solving settings constitute the empirical basis of the study. Findings show that peers can provide valuable support in form of elicitation of each othersí understanding. Furthermore, digital visualising support tools provide additional support by being used as depictive resources enabling students to explicate their (mis)understandings for each other. Most importantly, the study shows the significance of teacher intervention in form of elicitation of studentsí understanding and work-organisation.

H 21

27 August 2015 13:45 - 15:15

Room Blue2_D2

Paper Presentation

Technology integration

Technology integration

Keywords: Case studies,Qualitative methods,Educational technology,Technology,Secondary education,Computer-assisted learning,Experimental studies,Student learning,Content analysis,Pre-service teacher education,Peer interaction,Higher education,Computer-supported collaborative learning

Sig's: SIG 11 - Teaching and Teacher Education,SIG 7 - Learning and Instruction with Computers

Chairperson: Sarah Howard, University of Wollongong, Australia

The Evolvement of Teachers' Role and Professional Identity in 1:1 Personal Laptop Classrooms

Case studies,Qualitative methods,Educational technology,Technology,Secondary education,Computer-assisted learning

Esty Doron, Levinsky College, Israel; Ornit Spektor-Levy, Bar-Ilan University, Israel;

One-to-one programs are defined by three criteria: (a) The machine is a laptop, which (b) is connected to the Internet, and (c) is used to complete academic tasks. A 1:1 environment has the potential to influence teachers' roles and professional identities, but there is disagreement regarding the effects. This case study is based on the phenomenological methodology. It examines the ways in which teachers shape and refine their role and professional identities while teaching in 1:1 classrooms. The aim of the research is to track the changes one-to-one classroom teachers undergo. Eight volunteer teachers from two middle schools, each at different stages of implementing the 1:1 program, participated in the research. The research tools included in-depth semi-structured interviews conducted at three different time points during the implementation process; classroom observations; and task analyses. Analysis of the interviews yielded five main categories. The classroom observations and the task analyses revealed difficulty in changing the teaching paradigm from a teacher-centered toward a more student-centered one. Results indicate that teachers develop along different paths and levels of commitment toward 1:1 programs: ascending, descending, and stable. This research demonstrates that the implementation of 1:1 programs may lead to non-linear and confused changes in role and professional identities, as well as inner contradictions and conflicts. These findings lead to the conclusion that teachers should be provided with on-going support, scaffolding, and opportunities to share with other teachers in order to maintain ascending or stable commitment patterns.

An interaction effect between cognitive style and order of learning with modeling tools and sims

Experimental studies,Educational technology,Student learning,Technology,Computer-assisted learning

Charoula Angeli-Valanides, University of Cyprus, Cyprus; Nicos Valanides, University of Cyprus, Cyprus; Eirini Polemitou, University of Cyprus, Cyprus; Elena Frangoulidou, University of Cyprusc, Cyprus;

The use of modeling and simulation tools in young childrenís education is a research field of great interest. Modeling tools are powerful mental tools for the creation and understanding of systems through a process of studying the relations among the variables of the entities comprising the system. Simulations constitute software tools that dynamically visualize the relations among entity variables. The study herein examined whether there was any interaction effect between the order of use of the tools and cognitive style on childrenís performance. Fifty-nine children aged between 5 and 6.5 years participated in the study. Participants were first categorized into field-dependent (FD) and field-independent (FI) learners, and then they were randomly assigned into two groups. Group A first learned with a modeling tool and then with a

simulation. Group B learned first with a simulation and then with a modeling tool. A statistically significant interaction was found between FD/I and the order of using the two types of software. FI children in group A outperformed FD children in the same group on the modeling task. However, these results were not observed with the FD children in group B indicating that learning first with simulations facilitated the subsequent learning with the modeling tool of FD children only. The results are significant, because they inform the long time debate regarding the order of using the two types of software with preschool children, but also preschool teachers in terms of deciding about what tool to integrate first in their classrooms.

Studentsí experiences of learning with iPads in upper secondary school from PLE point of view

Content analysis,Qualitative methods,Educational technology,Secondary education

Teemu Valtonen, University of Eastern Finland, Finland; Sini Kontkanen, University of Eastern Finland, Finland; Lasse Eronen, University of Eastern Finland, Finland; Hannu Koskela, University of Eastern Finland, Finland;

This research focuses on upper secondary level studentsí (n= 83) experiences of using personal iPads in their studies throughout the three years of upper secondary school. This research is based on results from one of the first schools in Finland where all the new upper secondary students were provided with iPads at the start of their studies. We define a personal iPad as a form of personal learning environment (PLE), indicating that students take more responsibility of building their own learning environments and ways of learning. In order to study studentsí experiences, the technological pedagogical content knowledge (TPACK) frame was considered. The data consists of 65 short stories written by students about how they would advise a new teacher and a new student to use iPads in teaching and learning. Analysis was conducted using qualitative theory guided content analysis. Results suggest that pedagogical approach has remained at a rather traditional level meaning that the role of a teacher in supervising and planning the use of iPads is in important position. Results indicate also that students do not have the courage to take responsibility of their learning with iPads. In the future, in order to reach a more modern approach for using iPads in teaching and learning, a more systematic approach and support for students are needed.

Incorporating Blogs to Transform and Revolutionize Pre-Service Teacher Education

Case studies,Pre-service teacher education,Peer interaction,Technology,Higher education,Computer-supported collaborative learning

Nikleia Eteokleous, Frederick University, Cyprus; Efi Nisiforou, Cyprus University of Technology, Cyprus;

This article calls upon the reorganisation and improvement of pre-service teachersí programs of study to correspond to the complex challenges of the rapidly changing, information rich and technology-based society. Any barrier in transforming pre-service teachersí education and generally teacher education programmes will have a direct impact on the effective integration of

technologies in classroom practices. A great challenge of todayís educational milieu is to examine how the emerging technologies have transformed teaching and learning as well as to leverage the preparation of pre-service teachersí program of study. The current paper aims to explore the potential of blogs as efficient learning environments for pre-service teachers. Secondly, it seeks to validate the effectiveness of a developed framework that intends to examine blogging as a problem solving process by employing a particular methodological approach. A number of 70 undergraduate students from the Department of Primary Education participated in the current research study. The paper reveals the great potential of blogging in giving voice to pre-service teachers in providing ideas and guidelines on how to design, organize and deliver effective and successful programs of study that will appropriately prepare pre-service teachers on how to integrate technology as a learning tool in their classroom practices.

H 22

27 August 2015 13:45 - 15:15

Room Cyan_F2

Paper Presentation

Assessment methods and tools

Assessment methods and tools

Keywords: Comparative studies,Quantitative methods,Educational technology,Reading comprehension,E-learning/ Online learning,Primary education,Mixed-method research,Assessment methods and tools,Higher education,Cooperative/collaborative learning,Achievement,Secondary education,Qualitative methods,Teaching/instruction,Language (Foreign and second)

Sig's: SIG 1 - Assessment and Evaluation

Chairperson: Attila Pasztor, University of Szeged, Hungary

Comparing the measurement effectiveness of computerised adaptive testing and fixed item testing

Comparative studies,Quantitative methods,Educational technology,Reading comprehension,E-learning/ Online learning,Primary education

Gyongyver Molnar, University of Szeged, Hungary; Andrea Magyar, University of Szeged, Hungary;

Computerized adaptive tests (CAT) are one of the most advanced methods for assessing the studentsí abilities. During the testing process the test is adapted to the studentsí ability level by administering only items of appropriate difficulty for the persons. The aim of this study is to

compare the effectiveness of fixed-item tests from an assessment perspective by (1) comparing the measurement precision of the two modes of tests; (2) outlining the difficulties of the delivered tests; and, finally, (3) comparing measurement error and test information functions in the two different environments. The samples for the study were drawn from children in years 10 and 11 at Hungarian primary schools (N=3220). During the research a fixed item test was administered to half of the students, the other part solved a five-stage adaptive test. The online data collection was carried out via internet by using the eDia platform. The measurement precision were estimated by the reliabilities, the standard error of measurement and by the test information functions of the tests. Regarding the results, the reliability of the adaptive version was significantly higher than of the fix version. The standard error of the adaptive version was significantly lower in each ability level than of the fix version. The adaptive test provided consistently higher information at every skill level than that of the fixed-form test, the differences were significant especially in the high and low ability levels. The study provided a promising step towards more precise educational assessment with using adaptive testing methods.

The interpersonal nature of peer assessment: Focus on anonymity and studentsí personality

Mixed-method research,Assessment methods and tools,Higher education,Cooperative/collaborative learning

Tijs Rotsaert, Ghent University, Belgium; Tammy Schellens, Ghent University, Belgium;

In peer assessment and feedback activities, studentsí perceptions towards interpersonal variables (for example friendship marking, fear of disapproval when giving low scores, distrust in own and othersí evaluative capabilities) can be decisive when students interpret assessment and feedback from peers, since it might negatively affect the outcomes of the activity. Furthermore, it is assumed that studentsí perceptions concerning interpersonal variables in the peer assessment process are influenced by their personal characteristics. Therefore, classroom interventions that acknowledge the dispositions of students and the power of peers in this process are needed. To decrease possible negative social effects, guaranteeing anonymity for the assessors has been explored. In this quasi-experimental study with 39 third-year bachelor students in Educational Studies, Mobile Response Technology (MRT) has been implemented which enables automatized data gathering of quantitative assessment and qualitative feedback. This study explores (1) secondary studentsí perceptions towards the new tool within an anonymous face-to-face peer assessment setting and (2) studentsí perceptions towards interpersonal variables. Moreover,(3) the relationship between the interpersonal variables and studentsí personality factors is studied. This study shows that MRT is an easy-to-use tool for facilitating face-to-face peer assessment practices since it offers the opportunity for immediate assessment and feedback, which is highly appreciated by students. Furthermore, providing anonymity to peer assessors results in positive perceptions towards interpersonal variables that might negatively affect the outcomes of the assessment activity. The present findings also point at the importance of considering studentsí personality factors in future studies on formative assessment.

Normative grading as a cause of grade incomparability and statistical methods as a possible solution

Quantitative methods,Assessment methods and tools,Achievement,Secondary education

Jukka Marjanen, University of Helsinki, Finland;

Exit exams for upper secondary schools are common in European countries. In some, including Finland, examination results are used to grant entry points to students applying for tertiary education. This can be problematic since the comparability of grades between different subjects and exams can be questionable. In Finland this is largely a consequence of studentsí vast freedom of exam choice as well as norm-referencing of grades. In literature statistical methods have been suggested as one possible solution to improve grade comparability. Grades can be made comparable only if exams measure the same thing, at least to a degree, regardless of their particular subject. In statistical terms this is true, if the latent ability structure underlying studentsí exam performance is nearly unidimensional. If the ability structure is strongly multidimensional, the statistical methods may produce grades just as incomparable as the normative grading system. This paper studies the dimensionality of the latent ability structure underlying studentís exam performance. The need for a new grading system is also examined by comparing examineesí level of competence in different exams. The data used consists of course grades and matriculation examination results of students that graduated from grammar school in 2012 (n=2094) and 2009 (n=2061). Structural equation modeling was applied in the dimensionality analysis and t-tests were used to compare examineesí competence in different exams. The results indicate that a new grading system is needed, but multidimensionality of the latent ability structure undermines the value of the statistical methods as a solution to the comparability problem.

An Investigation of the Teaching Practices Used in EFL Multi-exam Preparation Classes in Greece

Mixed-method research,Qualitative methods,Quantitative methods,Assessment methods and tools,Teaching/instruction,Language (Foreign and second)

Irini Papakammenou, University of Cyprus, Greece;

This paper, drawing on work in progress, aims to present an investigation into the washback effect (Alderson & wall, 1993) of multi-exam classes on teaching practices in Greece. It focuses on teachersí instruction providing a systematic investigation of teachersí teaching methodology when preparing English language learners for high-stakes exams. A distinction is made between ëmethodsí, ëactivitiesí and ëtasksí regarding teacherís methodology and the extent to which teachersí approaches are influenced by the nature and requirements of multi-exam classes is investigated. Greek students participate in more than one exam in the same exam period since they have a great number of language examinations to choose from. The term ëmulti-examí class best describes the variety of exams which are taught in the same exam preparation classes in Greece presenting an interesting pedagogical ecology. Therefore, English language examination culture has changed significantly creating new teaching needs and classroom ecologies. This new

teaching challenge calls for reflective investigation both regarding the nature of teaching and the research practices. This paper, will present not only the theoretical underpinnings and research design of the study but also the overall research methods, video recorded observations, pre-, post- and follow-up interviews with teachers, the questionnaire and the methods of analysis. It will then present findings showing the results on teachersí pedagogy and teacherís beliefs and the factors affecting their decisions. Finally, it will focus on results on washback effect of these exam preparation programmes which show how crucial is to investigate teaching and redefine existing educational realities.

H 23

27 August 2015 13:45 - 15:15

Room Brown_B7

Paper Presentation

Assessment methods and tools

Assessment methods and tools

Keywords: Psychometrics,Quantitative methods,Assessment methods and tools,Attitudes and beliefs,Physical Sciences,Primary education,Achievement,Mathematics,Design based research,Educational policy,School effectiveness

Sig's: SIG 1 - Assessment and Evaluation,SIG 18 - Educational Effectiveness

Chairperson: David Gijbels, University of Antwerp, Belgium

Presence of wording effects in TIMSS 2011 Science motivation subscales in five language samples

Psychometrics,Quantitative methods,Assessment methods and tools,Attitudes and beliefs,Physical Sciences,Primary education

Michalis Michaelides, University of Cyprus, Cyprus;

The study examined the factorial structure of the TIMMS 2011 subscales on student motivation in science using 4th-grade survey data from five European countries. The enjoyment, interest, and competence in science subscales comprised eighteen items, six of which were negatively worded. A number of latent variable models were specified and confirmatory factor analysis revealed that only two models which accounted for negative wording effects fitted the data adequately for all five samples. In a structural equation model, reading achievement scores from the PIRLS assessment were positively correlated to this wording effect factor. In particular, students who scored low on reading achievement and agreed with positively-worded motivational items were not equally inclined to disagree with the negatively-stated items of the

same construct. The findings of the study emphasize the need to validate the scales used in large-scale, cross-cultural studies of student outcomes, reveal the presence of systematic, construct-irrelevant variance due to reverse wording across various language samples, and suggest that the negative wording effect in young students relates to reading comprehension skills.

Students' task solving times and task solving efficiency on an online mathematics test

Quantitative methods,Assessment methods and tools,Achievement,Mathematics,Primary education

Tibor Vidakovich, University of Szeged, Hungary;

The research investigated the possibilities of online assessment of primary school students. The aims were to analyse the correlations between student achievements and times spent on solving the tasks, and to explore the effect of solving examples, task type and taskís position on task response times. For the assessment of the mathematics achievements of 2nd graders, an online test was developed. The tasks were previously tested with a paper-and-pencil version. In the online version, two example tasks were inserted in order to let the students rehearse the ways of giving answers. The sample comprised altogether 4,738 students. Tasks were administered using an online assessment platform which stored both item responses and task solving times. An indicator of ëstudent efficiencyí was computed for each task, showing the relation between these factors. The average student achievement was similar, while the average test-taking time was shorter than for the paper-and-pencil version. A significant correlation was found between test taking time and test achievement and, on most tasks, between task solving times and task achievements as well. But the hypothesized positive effect of solving the example tasks, and the effect of task difficulty on task solving times could not be verified. Student efficiency was in significant correlation with the achievement and with the task solving time, too. Our results verified the effect of task type and taskís position on student efficiency. Students seemed to be more efficient when solving closed tasks, and their efficiency was significantly lower on the first task.

Measures of school effectiveness: A test of inter-method reliability

Design based research,Quantitative methods,Educational policy,School effectiveness

Thomas Perry, University of Birmingham, United Kingdom;

The value-added (VA) methodology is the predominant technique for the estimation of school effects and is widely used in educational effectiveness research and school accountability systems internationally. There have been few attempts to validate school VA scores using alternative measurement approaches. Recent research has highlighted the potential of regression discontinuity designs (RDD) to generate school effectiveness estimates with initial results suggesting that RDD is a viable approach to school effectiveness measurement. This alternative to VA estimation presents an opportunity to compare estimates based on fundamentally different approaches to inference and consider the validity of both measures using empirical evidence. To date, only one study known to this author has compared VA and RDD measures, generating

estimates for 18 schools in two consecutive year groups and finding a fair degree of agreement. The present study builds on this and other recent work in this area by comparing both measures using a large English dataset (n=148,135) spanning 342 schools, 10 local authorities, 6 consecutive school year groups (English school years 3-9) across 3 calendar years. The regression discontinuity approach is used within a multi-level framework and the model is extended to include multiple cut-off points. Results of analyses are presented to address the primary research question concerning the extent to which estimated school effectiveness from VA and RDD approaches differ. To inform the interpretation of the results, common and unique threats to validity of each design are considered and the implications for both approaches to school effectiveness measurement are discussed.

H 24

27 August 2015 13:45 - 15:15

Room Blue2_D1

Paper Presentation

Social interaction in L&I

Social interaction in L&I, learning approaches, conceptual change and writing

Keywords: Case studies,Video analysis,Student learning,Writing/Literacy,Higher education,Learning in context,Mixed-method research,In-service teacher education,Attitudes and beliefs,Social aspects of learning,Social interaction,Interdisciplinary,Experimental studies,Cognitive skills,Comprehension of text and graphics,Learning approaches,Teacher professional development,Competencies,Conceptual change,Social sciences

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 12 - Writing,SIG 2 - Comprehension of Text and Graphics,SIG 3 - Conceptual Change

Chairperson: Tsafrir Goldberg, University of Haifa, Israel

Professional Trajectories of learning ñ Mediation through writing

Case studies,Video analysis,Student learning,Writing/Literacy,Higher education,Learning in context

Ian Thompson, University of Oxford, United Kingdom; Line Wittek, University of Oslo, Norway;

This conceptual paper focuses on writing as a tool for professional development in the context of Norwegian and UK initial teacher education. We aim at suggesting a tentative framework for analysing the possible roles that writing can take as a mediational tool in students' trajectories of learning. Our framework draws on a sociocultural perspective, and involves the core concepts of

learning trajectories, mediation and reconceptualisation. This paper will draw on empirical data from a new comparative study of the reflective writing practices of prospective teachers in England and Norway. The research will extend the findings from an initial Norwegian study that showed that prospective teachers used their portfolio writing to both show to others their emergent professional identity as well as to position their identity for themselves. The mediational intention of this particular portfolio practice for the responsible teacher is to enhance student reflections and to use the short written assignments as a point of departure for discussions in class. We hypothesise that the activity of portfolio writing during practical training makes students recontextualise the different resources they are introduced to in their teacher training program; they reposition themselves and transform their interpretation of the different resources into structures of professional identity.

Alignment of Teacher and student views regarding the educational process

Mixed-method research,In-service teacher education,Attitudes and beliefs,Social aspects of learning,Social interaction,Interdisciplinary

Miguel Nussbaum, Pontificia Universidad Catolica de Chile, Chile; Anita Diaz Suarez, Pontificia Universidad Catolica de Chile, Chile;

Research shows that schools are most effective when they take into consideration their studentsí needs in the educational process. This study examines how aligned teacher and student views are with regards to the different components of the teaching/learning process. A quantitative study involving 731 students and 30 teachers from 30 schools examines the alignment of teacher and student views of the educational process. We observe that students and teachers have different views of classroom objectives, what they need to meet these objectives and the classroom conditions that are required to meet these objectives. This study reveals that there is little awareness of the problem and that teachers do not feel it is their issue to resolve.

Effects of Orienting Learners to Study Terms or Processes on Highlighting and Achievement

Experimental studies,Student learning,Cognitive skills,Comprehension of text and graphics,Learning approaches,Higher education

Philip Winne, Simon Fraser University, Canada; Zahia Marzouk, Simon Fraser University, Canada; Ilana Ram, Simon Fraser University, Canada; John C. Nesbit, Simon Fraser University, Canada; Derra Truscott, Simon Fraser University, Canada;

A meta-analysis found highlighting while studying benefits learning (Bisra et al., 2014) but what should learners highlight? We oriented learners to study particular types of information (terms or processes), traced what learners highlighted, and measured learning by free recall plus prompted recall of terms and of processes. Learners oriented to study processes highlighted 22% more idea units overall than learners oriented to study terms (p=.014), only 8% more idea units related to terms (p?.10), but 34% more idea units related to processes (p.001). Groups did not differ on free recall (p=.923) or prompted recall of terms (p?.10) but learners oriented to study processes

recalled 74% more process-related idea units (p=.057). Idea units highlighted were better recalled than non-highlighted units with a large effect size, d = 2.985 (p=.001), but non-highlighted units were also recalled. We recommend orienting learners to study conceptual assemblies rather than just terminology, and to highlight while studying.

Theorizing in practice: Instruction for application of psychological and pedagogical theories

Student learning,Teacher professional development,Competencies,Conceptual change,Social sciences,Higher education

Martin Klein, Saarland University, Germany; Kai Wagner, Saarland University, Germany; Eric Klopp, Saarland University, Germany; Robin Stark, Saarland University, Germany;

Theory application competences, e.g. for the reflection or explanation of complex school situations, are a key skill for teachers. However, student teachers often have problems in this regard that lead to typical errors in the process of theory application. Our approach uses errors as learning opportunities, drawing on design principles to promote conceptual change. Student teachers work collaboratively on authentic case scenarios within a learning environment based on learning from instructional errors. The scenarios demonstrate typical errors in theory application in complex school situations and contrast them to correct examples. The effectiveness of the learning environment and different instructional support measures was shown in studies. Students in the experimental conditions improved the quality of their explanations in scenario-based tests and were substantially superior to a control group. Furthermore, their beliefs with respect to the problem-solving potential of scientific knowledge for coping with school situations improved. A current study investigated the sustainability of the learning outcomes as well as effects of a second seminar phase that is systematically linked to the learning environment. Learning outcomes were stable until the end of the semester; however, the second seminar phase did not lead to additional learning.

I 1

27 August 2015 15:45 - 17:15

Room Green_A8

ICT Demonstrations

Inquiry learning

WISE in Europe: Discovering the Web-based Inquiry Science Environment from three perspectives

Keywords: Educational technology,Synergies between learning, teaching and research,Science education,Computer-supported collaborative learning

Sig's: SIG 20 - Computer Supported Inquiry Learning

Chairperson: Annelies Raes, Ghent University, Belgium

WISE in Europe: Discovering the Web-based Inquiry Science Environment from three perspectives

Educational technology,Synergies between learning, teaching and research,Science education,Computer-supported collaborative learning

Annelies Raes, Ghent University, Belgium; Astrid Wichmann, Ruhr University Bochum, Germany; Sten Ludvigsen, University of Oslo, Norway; Torunn Aanesland Stromme, University of Oslo, Norway; Ingo Kollar, University of Augsburg, Germany; Tammy Schellens, Ghent University, Belgium; Jim Slotta, OISE University of Toronto, Canada; Marcia Linn, University of California-Berkeley, United States;

The opportunities of web-based collaborative inquiry are reflected in various theory-driven inquiry learning environments (ILEs) world-widely researched in the Learning Sciences and in the context of Computer-Supported Collaborative Learning (CSCL) research. One outstanding ILE is the Web-based Inquiry Science Environment (WISE) that has been developed at the University of California, Berkeley according to the Knowledge Integration framework. WISE projects have been used extensively in science classrooms mainly in the US. Besides English language projects, the WISE curriculum library supports other languages as well. European initiatives from Germany, Norway and Belgium adopted WISE using its newest features in science classrooms. In this ICT Demo, we will introduce WISE from the learnerís perspective, the teacherís perspective and the researcherís perspective. We will present WISE and its newest features including the WISE Idea Manager, the WISE teacher tools and WISEís Research Data Output. Furthermore, we will discuss how WISE design is guided by the Knowledge Integration framework. The organization of the session will leave room for hands-on experiences with various features of the WISE environment as a learning, teaching, and research tool.

I 2

27 August 2015 15:45 - 17:15

Room Blue2_D1

ICT Demonstrations

Online learning/e-learning

Writing Aid Dutch: process-oriented feedback for academic texts in an online application

Keywords: Design based research,Educational technology,Literacy,Writing/Literacy,E-learning/ Online learning,Computer-assisted learning

Sig's: SIG 12 - Writing

Chairperson: Jordi Heeren, KU Leuven, Belgium

Writing Aid Dutch: Process-oriented feedback for academic texts in an online application

Design based research,Educational technology,Literacy,Writing/Literacy,E-learning/ Online learning,Computer-assisted learning

Lieve De Wachter, ILT/K.U.Leuven, Belgium; Margot D'Hertefelt, ILT KU Leuven, Belgium; Jordi Heeren, KU Leuven, Belgium;

Students at universities and colleges often experience difficulties with writing, irrespective of the educational field they are in. Needs analyses have pointed out that the most frequent problems are text structure and cohesion, academic style and spelling (Berckmoes & Rombouts 2009; De Wachter & Heeren 2011; Peters & Van Houtven 2010; Tahon 2012). Despite many interventions such as writing classes, the transfer between theory and practice remains difficult. This is not only frustrating for students but also for teachers, who often have to correct the same mistakes. From both perspectives the need for an effective and process-oriented writing support is strong. In order to respond to this need the online ëWriting Aid Dutchí is developed at KU Leuven (Belgium). Its aim is to offer students process-oriented and individualized writing support concerning text structure, style and spelling. Those problems are not corrected, but marked and provided with feedback. Hence, studentsí self-learning processes, autonomy and responsibility are encouraged. A small effect study conducted among 34 students with different educational backgrounds (college students versus university students) shows that in the domain of style, progress was made on issues such as ëpassive voiceí, and avoiding vagueness in terminology and phrasing. In the domain of structure, more than half of the subjects improved on coherence and cohesion. However, in the domain of elementary language skills (spelling, basic grammar issues) no clear progress was made. At the same time, the academic bachelors' texts improved more than the college students'.

I 3

27 August 2015 15:45 - 17:15

Room Yellow_G2

Workshops

Research methodology

Workshop Mixed methods in educational research

Keywords: Mixed-method research,Qualitative methods,Quantitative methods,Researcher education,Social sciences

Sig's: SIG 17 - Qualitative and Quantitative Approaches to Learning and Instruction

Chairperson: Judith Schoonenboom, University of Vienna, Austria

Workshop Mixed methods in educational research

Mixed-method research,Qualitative methods,Quantitative methods,Researcher education,Social sciences

Judith Schoonenboom, University of Vienna, Austria;

In this workshop, a method for mixed methods design is presented, in which researchers consider possibilities for mixing at each stage of the research process anew. By applying them to their own research, participants become acquainted with two fundamental goals of mixing, namely strengthening research components, and broadenings oneís knowledge of the phenomenon. Each stage of the research process anew can function as a ìpoint of addition,î at which a second research component is added, which is then later integrated with the first research component in the ìpoint of integration.î In addition, specific problems of integration are discussed. This method addresses three important problems related to current mixed methods design. It recognizes that it is not very useful to classify whole studies as belonging to a particular mixing design, it acknowledges that one ìpoint of interfaceî is an insufficient base for designing mixing, and it extends the distinction between concurrent and sequential design beyond the stage of data collection and data analysis.

I 4

27 August 2015 15:45 - 17:15

Room Blue2_D2

Workshops

Learning disabilities and special education

Cross Cultural Perspectives on Teachers' Attitudes towards Inclusion and Pupil Learning Environments

Keywords: Quantitative methods,Special education,Attitudes and beliefs,Interdisciplinary

Sig's: SIG 15 - Special Educational Needs

Chairperson: Jeremy Monsen, Tri Borough Consortium of Educational Psychologists (ELCEP), United Kingdom

Cross Cultural Perspectives on Teachers' Attitudes towards Inclusion and Pupil Learning Environments

Quantitative methods,Special education,Attitudes and beliefs,Interdisciplinary

Jeremy Monsen, Tri Borough Consortium of Educational Psychologists (ELCEP), United Kingdom; Stephan Kielblock, Justus-Liebig-University Giessen, Germany;

Across the world the implementation of more inclusive educational initiatives and practices is increasing in momentum following the Salamanca Statement and Framework for Action on Special Needs (UNESCO, 1994). Such policy regarding the education and placement of children and young with special educational needs within supported mainstream classrooms has had enormous implications for teachers and those who support them. Cross cultural research shows that a key variable in the success or failure of more inclusive approaches is teacher attitudes and beliefs towards the concept. Four studies will form the core content of the workshop. First, a study in New Zealand (Monsen, & Frederickson, 2004) and second, a study in England (Monsen, Ewing, & Kwoka, 2013), both about teachersí attitudes towards mainstreaming/inclusion. Third, a study that elaborates the psychometric properties of the ëTeachersí Attitude towards Inclusion Scaleí (TAIS) used in the former two studies (in press). And fourth, an exploratory interview study that approaches the individual attitudes towards inclusion of teachers at German mainstream all-day schools (in preparation). The workshop aims to remind participants of the origin, history and development of the inclusive education movement, highlighting debates and issues. After discussing the development of the TAIS the workshop then aims to critically debate with participants whether it would be possible to adapt the TAI Scale to non-English speaking educational contexts (e.g. Germany) so as to enable much wider international comparative research to be undertaken on the topic of ëeducational inclusion and practiceí.

I 5

27 August 2015 15:45 - 17:15

Room Brown_B1

Thematic Poster

Comprehension of text and graphics

Comprehension of text and graphics

Keywords: Content analysis,Learning analytics,Assessment methods and tools,Comprehension of text and graphics,Conversation/ Discourse analysis,Instructional design,Cognitive skills,Reading comprehension,Primary education,Learning in context,Experimental studies,Quantitative methods,Reflective society,Secondary education,Student learning,Teaching/instruction,Multimedia learning,Attitudes and beliefs,Morality,Social aspects of learning,Citizenship education,Values education

Sig's: SIG 18 - Educational Effectiveness,SIG 2 - Comprehension of Text and Graphics,SIG 23 - Educational Evaluation, Accountability and School Improvement,SIG 6 - Instructional Design

Chairperson: Jean-Michel Boucheix, University of Dijon, LEAD-CNRS, France

Validating Text-Mining Software to Study the Effects on Semantic Similarity

Content analysis,Learning analytics,Assessment methods and tools,Comprehension of text and graphics

Gregory Trevors, McGill University, Canada; Marianne Chevrier, McGill University, Canada; Krista Muis, McGill University, Canada; Reinhard Pekrun, Ludwig-Maximilians-Universitat (LMU), Germany; Gale Sinatra, University of Southern California, United States; Eric Poitras, University of Utah, United States;

The current paper builds off previous research that used text-mining to examine the effects of epistemic beliefs and epistemic emotions on written summaries of multiple conflicting documents about a controversial topic. We presently report on two studies to validate the findings obtained from text-mining software. A similar research design was used across studies wherein university students reported their emotions after reading three conflicting texts on climate change and their epistemic beliefs about the topic. In the first study, written summaries from 282 participants were manually coded for semantic similarity between individual texts and results were correlated with text-mining data. In the second study, the think-aloud protocols while reading of 54 participants were manually coded for learning strategies and results showed that combinations of cognitive and metacognitive processes predicted the semantic similarity of summaries obtained from text-mining. Overall, the current studies provide evidence for construct and predictive validity for a novel method in educational research.

"Whatís the direction of inquiry of Chilean teachers in reading comprehension in classroom?

Conversation/ Discourse analysis,Instructional design,Cognitive skills,Reading comprehension,Primary education,Learning in context

Carolina Iturra, Universidad de Talca Chile, Chile; Javier Rosales, Universidad de Salamanca, Spain; Tatiana Canales, Universidad de Talca, Chile;

The aim of this paper is to describe the kind of questions that teachers develop to promote high levels of comprehension, thinking and autonomy, when they work in text comprehension with their students. 30 text comprehension classes from second cycle of primary education were selected. These classes are part of video evidence from the 2008 teacher performance evaluation system. To analyze these classes, conversational turns in each class were transcribed, to later segment those turns dedicated to work directly the ideas extracted from the texts. After that, the verbal exchanges between teachers and students were analyzed considering the type of questions elaborated by teachers according to the expected type of understanding (selection, interpretation and reflection) and to the promoted degree of autonomy (invasive or noninvasive). To give reliability to the analysis, in cases of doubts related to the transcript, the video were consulted to verify the criteria of segmentation of the speech , giving credibility to the process and transferability . The results showed that the majority of structured questions corresponding to the

category selection, while the least frequent were interpretation. Regarding the type of cycle, it was found that most of them were not invasive. On the other hand, significant differences associated with the rating of the performance of teachers, both intragroup and intergroup analyzes were identified.

Direct and indirect effects of critical thinking skills on critical reading comprehension

Experimental studies,Quantitative methods,Assessment methods and tools,Reflective society,Comprehension of text and graphics,Secondary education

Christian Tarchi, University of Florence, Italy; Lucia Bigozzi, University of Florence, Italy;

Teachers should aim for critical reading comprehension, now more than ever. Critical-thinking skills are necessary for all adults and students, and this is true especially when applied to reading comprehension. Text comprehension plays a fundamental role in the processes of acquisition, sharing, construction of knowledge. However, recent national and international assessment programs (e.g. PISA study) showed that reading comprehension performances are still not satisfactory in most students. In particular students fail in reading critically expository texts. Critical thinking has been largely inquired in the past, but the interest on this construct was recently renewed (e.g. Partnership for 21 Century Skills). Thus, it is important to determine how general critical thinking processes influence the student's ability to read critically a text, in light of prior knowledge and inference-making skills. This study explored this relationship on 140 Italian 7-graders. The following constructs were assessed: prior knowledge, critical thinking skills, critical thinking disposition, inference-making skills, topic interest, and critical comprehension of a text. Data were analyzed through a series of multiple regression analysis and mediational analyses. Preliminary result show that students' critical thinking skills do not directly influence their ability to critically analyze a text, but they rather show an indirect effect via prior knowledge of topic and inference-making skills.

Prezi in classrooms: Does it provide more detailed and better organized knowledge than PowerPoint?

Quantitative methods,Student learning,Teaching/instruction,Comprehension of text and graphics,Secondary education,Multimedia learning

Jonathan Spielmann, Ludwig-Maximilian-Universitat (LMU), Germany; Nadine Baumann, Ludwig-Maximilian-Universitat Munchen, Germany; Simone Franz, Ludwig-Maximilian-Universitat Munchen, Germany; Sarah Polzin, Ludwig-Maximilian-Universitat Munchen, Germany; Janosch Maier, Ludwig-Maximilian-Universitat Munchen, Germany;

The cognitive theory of multimedia learning (CTML) decsribes how learners can acquire a higher level of detailed knowledge if texts are accompanied with images (Mayer, 2009). Presentation forms with grafical organizers such as Prezi try to present learning content in a way where texts are embedded in graphical structures that show the entire network organization of a topic. Due to the CTML mechanisms, grafical knowledge organization in presentations (Prezi vs. PowerPoint) should lead to a better organization of knowledge as well as more detailed

knowledge. A positive correlation between knowledge organization and the level of knowledge detail is assumed. Due to the lack of quantitative studies comparing presentation forms with grafical organizers with traditional computer-generated slides, this study contributes to the early exploration of this field. 57 high school students were presented either a PowerPoint or Prezi presentation about an economic topic. There was no statistical differences between both groups neither in knowledge organization nor in the level of knowledge detail. However a moderate correlation between knowledge organization and level of knowledge detail was found immediately ($r = .43$, $p = .00$) and two weeks after the presentation ($r = .42$, $p = .00$).

Impact of Need for Cognition and Design of Infographics on Attitude Change: A Study on Homophobia

Attitudes and beliefs,Comprehension of text and graphics,Morality,Social aspects of learning,Citizenship education,Values education

Sabine Preuss, Universitaet Koblenz-Landau, United States; Cecile Nurra, Univ. Grenoble Alpes, Grenoble, France, France; Erica de Vries, Universite Pierre-Mendes-France, France; Neil Schwartz, California State University, United States;

An infographic of a pro-social campaign represents a combination of text and graphics, which aims to persuade a large audience of a specific idea or view. Research suggests that people differ in their preferences of text-picture combinations. An infographic of a pro-social campaign needs to be appropriate for processing in a short period of time, and by a large and varied audience made up of people with different characteristics. Therefore, the design of text-picture combinations must take individual differences into consideration. In this study, we investigate the level of Need for Cognition (NFC) and how this tendency to enjoy thinking impacts the effect of an infographic on homophobia. The goal of the present research is to design a single infographic that aims to persuade people regardless of their level of NFC. According to the literature, such a persuasive message has to contain peripheral cues as well as qualitative arguments and facts. We expect a significant interaction between the level of NFC and the characteristics of infographics. Based on design principles identified in the literature, three infographics were created: two on homophobia, one on renewable energy. Participants were randomly assigned to one of six conditions: 2 (Low vs. High NFC) x 3 (Designed for both vs. Designed for low-only vs. Control Infographic). The results of a pilot-study showed no significant effects. Some methodological issues will be discussed and the results of the improved study will be presented.

Pictorial symbols comprehension and theory of mind in children

Quantitative methods,Student learning,Cognitive skills,Comprehension of text and graphics

Eleonora Esposito, University of Florence, Italy; Giuliana Pinto, Department of Educational and Psychology, Italy;

What it means to understand pictorial symbols? What does the child know about pictorial symbols? Understanding and use of pictorial symbols are involved to realize that a given entity is

a symbol; to know what the graphic symbol represents; to know how the symbol and its referent are related. Recently, researcher shows the implication of theory of mind in development of pictorial symbolic comprehension. Aim: This pilot study applied a new methodology to explore the pictorial symbolic comprehension in children and examine how this comprehension relate with theory of mind. Method: 18 videos were shown to 28 children (2-to10-years-old). In these videos a person is doing something and the child have to answer what the person is doing. The videos show the same drawing (circle, rectangle, triangle) in three different contexts: salient, non-salient and neutral. Two tests of false-belief task, droodle task and unexpected contents test, were used to test childrenís theory of mind. Results: Statistical descriptive and correlational analyses have shown that the pictorial symbolic comprehension in the preschoolers is better if the context is salien. Instead, schoolchildren have a good level of pictorial symbols comprehension regardless of the context. Theory of mind ability and pictorial symbols comprehension are positively related. Implications: This methodology could be a new way to investigate the childrenís pictorial symbols comprehension and increase our understanding on what the child knows on graphic symbols. This is important because the child to communicate meanings through symbols must, first, learn to understand the symbols.

I 6

27 August 2015 15:45 - 17:15

Room Green_A6

Thematic Poster

Early childhood education

Early childhood education and self-efficacy

Keywords: At-risk students,Cognitive development,Parental involvement in learning,Early childhood education,Quantitative methods,Student learning,Self-efficacy,Mathematics,Primary education,Motivation and emotion,Researcher education,Attitudes and beliefs,Developmental processes,Science education

Sig's: SIG 5 - Learning and Development in Early Childhood,SIG 8 - Motivation and Emotion

Chairperson: Mikko Aro, University of Jyvaskyla, Finland

Effects of parenting on young childrenís cognitive and socio-emotional development

At-risk students,Cognitive development,Parental involvement in learning,Early childhood education

Annemiek Veen, University of Amsterdam, Netherlands; Ineke van der Veen, University of Amsterdam, Netherlands; Anna Heurter, University of Amsterdam, Netherlands;

For children, and especially those in the preschool period, the interaction with parents plays a central role in their development. Relatively little research into the relationship between parenting and the development of children has focused on very young children, on cognitive development, and on the differences associated with ethnic background. This contribution therefore identifies differences between different groups of immigrant and non-immigrant parents with respect to parenting characteristics and parenting stress and social support, and then looks at the relationship between the parenting characteristics and the cognitive and socio-emotional development of children during their second and third years. Data was used from the pre-COOL cohort study, a Dutch cohort study into the effects of preschool and early school education. Amongst other things, this showed that non-immigrant parents scored significantly higher for consistency compared to Moroccan and Turkish parents and parents from other non-Western countries.

Calibration of self-efficacy in addition fluency among primary school children

Quantitative methods,Student learning,Self-efficacy,Mathematics,Primary education,Motivation and emotion

Helena Viholainen, University of Jyvaskyla, Finland; Tuija Aro, University of Jyvaskyla, Finland; Pilvi Peura, University of Jyvaskyla, Finland; Riikka Sorvo, University of Jyvaskyla, Finland; Tuire Koponen, Niilo Maki Institute, Finland; Mikko Aro, University of Jyvaskyla, Finland;

Optimistic beliefs of oneís capabilities to successfully complete an academic task are needed to ensure effort and persistency in demanding learning situations. However, too high overestimation, which has been shown in adolescents with learning difficulties, may prevent learning. Whether these overoptimistic self-efficacy beliefs are characteristic to primary school age children was the focus in this study. First, in an estimation task of addition fluency participants (N=1056: 512 girls, 544 boys) from grades 2ñ5 evaluated how many additions they estimated they could calculate during 30 seconds. Second, in an addition task participants had to solve similar additions. Performance score was standardized within the grade level in order to form three skill levels: Dysfluent, Average and Fluent. ANOVA was used to test the effects of gender, grade and skill level in estimation accuracy (=proportional difference between estimation and performance). We found that primary school age children overestimate their skills. However, amount of estimation bias was bigger among 2nd grade boys than girls. We found also a tendency that estimation accuracy increases as the fluency increases. Interestingly, this estimation bias was skill-specific, i.e. there were no differences in reading fluency estimations between grade, gender or skill level groups. We suggest that in order to promote childrenís motivation and persistence for learning teachers should help children to calibrate their skills more realistic, i.e. give realistic and accurate feedback about the enhancement of skills.

Childrenís participation right, preschool classroom quality and self-competence

Quantitative methods,Researcher education,Attitudes and beliefs,Developmental processes,Science education,Early childhood education

Margarida Fialho, ISCTE-IU, Portugal; Hugo Gomes, ISPA ñ Instituto Universitario de Ciencias Psicologicas, Sociais e da Vida, UIPCDE, Portugal , Portugal; Luisa Lopes, ISCTE ñ IUL, Portugal; Cecilia Aguiar, ISCTE-IUL, Portugal; Nadine Correia, University Institute of Lisbon (ISCTE - IUL), Portugal;

Childrenís participation right has gained scale in the research field. According to Katz (1998), assessing the quality of preschool settings must take into account children voices. The positive relationship between children's participation and the quality of preschool contexts is documented and indicates that children who attend high-quality preschool settings report more opportunities to participate or exert influence (Sheridan, 2007). Because childrenís participation is a criterion to be taken into account when evaluating preschool quality and there are few studies on this topic, including little empirical evidence on the effects of participation on preschool childrenís development, we aimed to investigate the associations between classroom quality, teacherís beliefs and perceptions about childrenís participation, and one particular construct related to childrenís outcomes ñ childrenís perceptions of self-competence. Participants were (a) 40 preschool teachers, which filled in the questionnaire on ìTeacherís perceptions about the implementation of childrenís participation right in preschool settingsî; (b) 40 preschool classrooms of the Lisbon area, observed with the Classroom Assessment Scoring System (CLASS; Pianta, La Paro, & Hamre, 2008), and (c) 130 children attending those classes, assessed with the Portuguese adaptation of ìThe Pictorial Scale of Perceived Competence and Social Acceptance for Young Childrenî (Mata, Monteiro, & Peixoto, 2008). Associations between variables will be analyzed and preliminary results will be presented.

I 7

27 August 2015 15:45 - 17:15

Room Green_A3

Thematic Poster

Emotion and affect

Emotion and affect

Keywords: Meta-analysis,Emotion and affect,Emotion and cognition,E-learning/ Online learning,Computer-assisted learning,Motivation and emotion,Mixed-method research,Teacher professional development,Social sciences,Secondary education,Qualitative methods,Self-regulation,Quantitative methods,Achievement,Peer interaction,Experimental studies,Neuroscience,Mathematics,Higher education,Student learning

Sig's: SIG 22 - Neuroscience and Education,SIG 8 - Motivation and Emotion

Chairperson: Simon Beausaert, Universite catholique de Louvain (UCL), Belgium

Another ìEî in E-Learning: A Meta-Analytic Investigation of Emotions in Technology-Based Learning

Meta-analysis,Emotion and affect,Emotion and cognition,E-learning/ Online learning,Computer-assisted learning,Motivation and emotion

Kristina Loderer, Ludwig-Maximilians-Universitat (LMU), Germany; Reinhard Pekrun, Ludwig-Maximilians-Universitat (LMU), Germany; James Lester, North Carolina State University , United States;

Research on the role of emotions in technology-based learning has been accumulating over the past decades (Artino, 2012; Calvo & DíMello, 2012), covering a range of different emotions as well as diverse learning technologies. The present study aims to synthesize these findings in the form a meta-analysis, focusing on both potential causes and effects of emotions in interactive e-learning environments. In line with general theories and research on emotion and learning (Pekrun, 2006; Pekrun & Linnenbrink-Garcia, 2014), a preliminary survey of articles retrieved via a database search indicated that cognitive processes and outcomes connected to learning with various types of electronic media are shaped by a multiplicity of emotions extending beyond the traditional computer anxiety construct. Integrating empirical findings of these studies is pivotal for future research and educational practice as innovative learning technologies continue to gain ground and technological advances open up new opportunities for emotionally sound design.

Studentsí Perceptions of Teachersí Emotions and Teachersí Emotion Regulation Strategies

Mixed-method research,Teacher professional development,Emotion and affect,Social sciences,Secondary education,Motivation and emotion

Jingwen Jiang, University of Turku, Finland; Marja Vauras, University of Turku, Finland; Simone Volet, Murdoch University, Australia;

Based on Grossís process model of emotion regulation, this research aims to investigate teachersí emotion regulation strategies and how they relate to studentsí perceptions of teachersí emotions. The participants were 4 teachers and 53 students in Grades 7-9 from an international school in Finland. Mixed methods were employed. Quantitative data was collected from the studentsí surveys and qualitative data from the teachersí semi-structured interviews. The findings showed that the teachers in this study employed situation selection, situation modification, attention deployment, cognitive change and suppression as the emotion regulation strategies. In addition, the math teacher, who used suppression, a form of response-focused emotion regulation, was perceived to display a considerably high frequency of negative emotions, whereas the other three teachers, who employed antecedent-focused emotion regulation, were perceived to display a relatively high frequency of positive emotions during teaching. Furthermore, the English teacher who used reappraisal was perceived to display a much higher frequency of positive emotions than the math teacher who employed suppression. These findings indicate that antecedent-focused emotion regulation might be more worth recommending than response-focused emotion regulation. In particular, reappraisal appears more effective than suppression in increasing positive emotion and reducing negative emotion. Finally, it is suggested that teachers should be

encouraged to abandon suppression and develop beliefs about empathy and caring to reinterpret situations and regulate their emotions. Key words: teacher emotions, studentsí perceptions of teachersí emotions, emotion regulation, suppression, reappraisal

Towards a self-reflective teacher: Narrative emotional diaries for improving self-awareness

Qualitative methods,Emotion and affect,Self-regulation

Sofia Dal Zovo, University of Verona, Italy;

Thanks to the emergence of the concept of ëemotional intelligenceí (Salovey and Mayer, 1990; Goleman, 1995) the world of education has extended its attention beyond the aspect of a content-oriented instruction, by also focusing on the emotional aspect of teaching (Greenberg, et. al2009; Day,2011; Nias,1996). Socio-emotional education means to integrate emotions within the contents of teaching (Morganti 2012; Waajid et al. 2013 Parker et al. 2009). The question research is: ìTo what extent are teachers aware of their own self-emotional experiences? How do teachers describe their emotional life/their self in a self-reflective diary?î The method that I used for analysis called IPA (Interpretative Phenomenological Analysis). The research tool adopted for this qualitative research (Connelly 1990; Creswell 2007; Denzin 2005) is the reflective diary (Piccone Stella 2008; Biffi 2010). This latter allows the research to probe into the emotional experience among teachers (Chase, 2005; Clandinin 2000; Richardson, 2000). Through this narrative practice it is possible to cultivate a reflective vision of oneís self and reality (Gubrium,2009; Fraser, 2004; Elliott,2005). The teacher becomes a researcher in the moment in which he/she experiments the ëreflective thinkingí (Dewey, 1986; Schoen, 2006).This study will consist in an international comparison between Italian teachersí and Maltese teachers. Principal findings of this research are : to acquire a deep self-knowledge and awareness of teachersí emotional experience in their daily scholastic life and to recognize, to understand and to manage self-emotions as key resources for educational practices.

Relationships between Studentsí Envy, Self-concept, and Academic Achievement

Quantitative methods,Achievement,Emotion and affect,Peer interaction,Secondary education,Motivation and emotion

Philipp Hartmann, Ludwig-Maximilians-Universitat (LMU), Germany; Felix Bradley, University of Munich, Germany; Reinhard Pekrun, Ludwig-Maximilians-Universitat (LMU), Germany;

Academic settings induce a variety of social achievement emotions like admiration, anger, contempt, envy, or sympathy. These emotions are experienced related to the success and failure of other persons in academic settings (Pekrun & Linnenbrink-Garcia, 2014). This study investigated the relationships between envy and important achievement-related constructs, namely subject-specific academic self-concept, deservingness (Feather & Sherman, 2002), causal attributions, and math grade. N = 266 students in grades 7-10 participated in the study. Envy was measured with the Social Achievement Emotions Questionnaire (Pekrun & Hartmann, 2014). Correlational analyses show that experiencing envy is associated with grades, subject-specific academic self-concept, deservingness, and the low-control causal attributions luck and talent.

Overall our findings highlight the importance of the social achievement emotion envy in academic settings.

When errors count: An EEG study investigating error processing under performance pressure

Experimental studies,Neuroscience,Emotion and cognition,Mathematics,Higher education

Frieder Schillinger, University of Gottingen, Germany; Bert De Smedt, University of Leuven, Belgium; Roland H. Grabner, University of Graz, Austria;

Choking under pressure impose a serious problem for many students taking high-stake tests. However, surprisingly little is known about how errors are processed in such evaluative settings and whether changed error processing contribute to performance impairments. The aim of the present study is to start answering these questions by combining behavioral with electroencephalography (EEG) indices of error processing. Participants performed a numerical stroop task in two pressure scenarios: a high pressure condition modeling real-life tests and a low pressure control condition. Specifically, we analyzed the negative deflection at centro-parietal recording sites after a response is given, which is typically more pronounced for errors than for correct answers (error-related negativity, ERN). The amplitude difference between error and correct trials (?ERN) has been demonstrated to be modulated by contextual factors. While we did not find clear behavioral differences between conditions, the ?ERN was significantly increased when pressure was applied. In line with attentional control theory, this finding suggests that errors are processed differently under pressure, but a subsequent drop in performance can be mitigated, supposedly by compensatory strategies.

Emotional experiences of passionate thinkers in the classroom

Quantitative methods,Student learning,Emotion and cognition,Mathematics,Secondary education,Motivation and emotion

Elisabeth Meier, Ludwig-Maximilians-Universitat (LMU), Germany; Reinhard Pekrun, Ludwig-Maximilians-Universitat (LMU), Germany;

Need for cognition (NFC) refers to an individual's tendency to engage in and enjoy effortful cognitive endeavors (Cacioppo & Petty, 1982). Passionate thinkers are assumed to experience more enjoyment during cognitive tasks and to work on them more persistently even if they are confused or frustrated. To date, there is little research on this topic and results regarding the emotional experiences of individuals low vs. high in NFC during cognitive tasks are inconsistent. The emotional experience during learning triggered by a high or low NFC, however, might at least partly explain the positive effects of NFC on achievement. Our study explored the emotional experience of passionate thinkers (high NFC) in the classroom (189 German high school students; 55.0% female; mean age 16.80, SD = 1.47 years). We expected students with higher NFC to experience more positive and less negative emotions in the classroom. We further assumed that NFC relates positively to achievement and analyzed whether this relationship was mediated by the experienced emotions. In line with hypotheses, our analyses showed that NFC

positively related to positive and negatively to negative emotions. We further found that enjoyment and hopelessness mediated the positive relationship of NFC and achievement. Our results indicate that the emotions triggered by NFC might partly explain the positive impact of NFC on academic achievement. The findings suggest paying more attention to the relationship between NFC and the emotions it triggers in order to foster our understanding of the mechanisms underlying the positive effects of NFC on academic achievement.

I 8

27 August 2015 15:45 - 17:15

Room Brown_B2

Thematic Poster

Higher education

Higher education

Keywords: Quantitative methods,Student learning,Attitudes and beliefs,Engineering,Higher education,Social aspects of learning,Social sciences,Mixed-method research,Pre-service teacher education,Interdisciplinary,Case studies,Researcher education,Learning in context,Assessment methods and tools,Teaching/instruction,Learning analytics,Competencies

Sig's: SIG 1 - Assessment and Evaluation,SIG 11 - Teaching and Teacher Education,SIG 4 - Higher Education

Chairperson: Crina Damsa, University of Oslo, Norway

Examining gender differences in engineering education

Quantitative methods,Student learning,Attitudes and beliefs,Engineering,Higher education

Linda Price, Open University, United Kingdom; Ingrid Svensson, Lund University, Sweden; Jonas Borell, Lund University, Sweden; John Richardson, The Open University, United Kingdom;

This study examines studentsí experiences on two degree programmes to explore gender issues in relation to the underrepresentation of women in engineering. Studentsí perceptions of the quality of their experiences were explored in a computer science programme, with a typical female proportion of 7%, and in an environmental studies programme with a typical female proportion of 63%. Data was collected using the Course Experience Questionnaire. Analysis was conducted on 10 years of data. The results indicate that women tended to perceive the workload and the clarity of the goals less positively than did their male counterparts. They also tended to rate perceptions of ëgood teachingí less positively, too. In order to improve womenís perceptions of their educational experience on these two engineering programmes, greater attention may

need to be paid to the clarity of the requirements and the clarity of the associated workload of the programmes.

The leisure-study interface and academic outcomes: Testing a structural model

Quantitative methods,Student learning,Social aspects of learning,Social sciences,Higher education

Lonneke de Meijer, Erasmus University Rotterdam, Netherlands; Marieke Meeuwisse, Erasmus University Rotterdam, Netherlands; Marise Born, Erasmus University Rotterdam, Netherlands; Sabine Severiens, Erasmus University Rotterdam, Netherlands;

An important part of studentsí lives takes place at school. In addition to school, students spend time with their families, at work, and are involved in leisure activities (e.g., spending time with friends, sports). As a consequence, students need to combine their role as a student with their roles as a family member, employee, and friend. Combining multiple roles can result in conflict between as well as facilitation of these roles. In recent decades, many studies have been conducted on the combination of different roles. These studies have predominantly investigated the negative aspects of combining various roles (i.e., workñschool conflict; e.g., Markel & Frone, 1998). It has also been proposed that, in contrast to the assumption of conflicting life domains, combining multiple roles may have a positive side. As a result, more recent familyñwork theorists have begun to suggest that one role domain may offer resources that can be utilized in another domain, leading to interrole facilitation or enrichment. Expanding on family-work (Ford, Heinen, & Langkamer, 2007), work-study (Butler, 2007) and family-study models (Meeuwisse, Born, & Severiens, 2011), this paper investigates a model for leisure-study conflict and facilitation using a sample of university students in the Netherlands (N = 1,981). Results showed that participation in leisure activities is an antecedent of both leisureñstudy conflict and leisureñstudy facilitation. In turn, leisureñstudy conflict negatively related to study effort, and leisureñstudy facilitation positively contributed to studentsí study effort. Effort positively predicted studentsí academic outcomes.

The childís rights approach in undergraduate Early Childhood Teaching programs in Chile

Mixed-method research,Pre-service teacher education,Interdisciplinary,Higher education

Marcela Pardo, Universidad de Chile, Chile; Daniela Jadue Roa, University of Chile, Chile;

This paper presents the results of a study exploring how the child/s rights approach is being incorporated into Chilean undergraduate Early Childhood Teaching programs. Its theoretical framework considered: the United Nations Convention on the Rights of the Child (UNCRC) and related documents; agency and participation as concepts describing current perspectives on childhood; and the international experience on the incorporation of this approach into Early Childhood Teaching programs. A mixed method design was adopted; it encompassed a survey and a multiple case study. The survey was applied on-line to all higher-education institutions offering an undergraduate degree in Early Childhood Teaching. The multiple case study involved

10 programs that profiled the countriesí diversity in higher education. Findings showed that although all participants have incorporated, to some extent, the childís right approach into their respective plans of study, all programs fail to establish a relationship between this approach and the pedagogical practice, suggesting also their insufficient understanding of the childís right approach. However, most participants expressed an interest to further incorporate this approach, recognizing difficulties to do it, such as limited access to specialized literature, lack of specialists, and competing demands to design the programs. This study is relevant because it indicates that state partiesí ratification of the UNCRC does not imply this is well understood within the population, suggesting the comprehensive incorporation of the child/s rights approach into undergraduate Early Childhood Teaching programs should be explicitly promoted. Further research is needed to identify potentials and obstacles towards this objective.

Engaging pre-service teachers in research: Part of an Australia-Malaysia transnational program

Case studies,Researcher education,Higher education,Learning in context

Sonia White, Queensland University of Technology, Australia; Erika Hepple, Queensland University of Technology, Australia; Donna Tangen, Queensland University of Technology, Australia;

Internationally there is interest in developing teachers as researchers as a means of ongoing professional renewal. The current study is longitudinal and explores the research learning journey of pre-service teachers participating in a transnational (Australia-Malaysia) degree program. Using survey design, this research determined research knowledge and the perceived value of research knowledge as pre-service teachers were introduced to research methods in Australia and implemented a research project in Malaysia. The results indicate a progression in learning, as well as evidence that this research knowledge is continued or maintained when the pre-service teachers return to their home university in Malaysia. At the end of the study there was evidence that the pre-service teachersí valued the role of research in informing their practice and the ongoing needs of the profession. The findings of this study have implications for both pre-service and in-service teacher research training, as well as transnational programs.

Disbeliefs in teaching evaluation: Analyzing non-response bias in online evaluation settings

Quantitative methods,Assessment methods and tools,Teaching/instruction,Higher education

Nora Dittmann-Domenichini, Swiss Federal Institute of Technology ETH Zurich, Switzerland; Tobias Halbherr, Swiss Federal Institute of Technology Zurich // ETH Zurich, Switzerland;

The impact of teaching evaluation on the quality of faculty instruction depends on the reliability of its results. Feedback rates are directly linked to the reliability and therefore the impact of evaluation results. The reliability and validity of online teaching evaluations is easily questioned, for they achieve in general lower response rates than paper and pencil evaluations, which are mostly realized in class. The study explores feedback rates and potential non response bias in evaluation results at ETH Zurich in a quasi-experimental design. The elimination of

administration medium (paper versus online) as confounding factor by using only online evaluation allowed us to analyze the specific effect of the administration mode factor (in class or outside class) on feedback rates and evaluation results. The aim of the study is to address on an empirical base the most frequent concerns and presumptions about online teaching evaluations.

Taking on verbal interaction: Assessing strategic and communicative action in higher education

Learning analytics,Student learning,Competencies,Interdisciplinary,Higher education

Edith Braun, University of Kassel, Germany; Georgios Athanassiou, University of Kassel, Germany; Kathleen Pollerhof, University of Kassel, Germany;

The acquisition of communication skills constitutes a major cross-subject learning outcome of higher education. Higher education institutions need to purposefully facilitate the development and assessment of different constituents of communication in order to prepare students for the labour market. Accordingly, there is a need for the assessment of verbal interaction as one of the major constituents of communication. Responding to this challenge, the round-table contribution will present a project that aims at providing both the theoretical fundaments and practical means for the assessment of verbal interaction competences in the context of higher education with a prospective view to transferability in the labour market. Drawing on the theoretical framework of communicative action of Habermas as its starting point, the approach consequently proposes a goal-relevant distinction of verbal interaction types: strategic and consent-driven. Subsequently, it attempts the integration of relevant components derived from known models of communication into one single compositional model of verbal interaction under the prism of the proposed typology. The practice-relevant focus of the project will be on two target groups of students, based on the nominally distinction of the prevailing goals of on-the-job communication: Business economics and teacher-training. The theory-based compositional model of verbal interaction will be presented in detail. Besides this, the prospective methodological considerations concerning assessment modality, potential employment of simulation techniques for operationalizing group specific verbal interaction, and model validation will be briefly outlined.

I 9

27 August 2015 15:45 - 17:15

Room Brown_B8

Thematic Poster

Instructional models and strategies

Instructional models and strategies, and assessment methods and tools

Keywords: Case studies,Psychometrics,Assessment methods and tools,Educational technology,E-learning/ Online learning,Quantitative methods,Teaching/instruction,Competencies,Mathematics,Reading comprehension,Mixed-method research,Student learning,Cognitive skills,Secondary education,Problem-based learning,Instructional design,Educational attainment,Language (L1/Standard Language),Primary education

Sig's: SIG 1 - Assessment and Evaluation,SIG 11 - Teaching and Teacher Education,SIG 18 - Educational Effectiveness,SIG 6 - Instructional Design

Chairperson: Markus H. Hefter, University of Bielefeld, Germany

Technical Incidents and Fairness in High-Stakes Computer-Based Examinations in Higher Education

Case studies,Psychometrics,Assessment methods and tools,Educational technology,E-learning/ Online learning

Tobias Halbherr, Swiss Federal Institute of Technology Zurich // ETH Zurich, Switzerland; Nora Dittmann-Domenichini, ETH Zurich, Switzerland; Claudia Schlienger, LET - educational development and -technology, Switzerland;

High stakes computer based assessments are becoming increasingly popular in many higher education institutions. While computer based assessments offer many advantages over paper based assessments, they also introduce new challenges to examination practice. One critically important challenge is finding ways to deal with technical incidents during exams effectively and being able to guarantee fairness and equal treatment to candidates despite any disturbances such incidents may cause. In this paper we present data from over twenty high-stakes online examinations with over 2í000 candidates at ETH Zurich. A first analysis compares the examination performance of candidates whose exams had to be temporarily interrupted due to technical incidents with examination performance of undisturbed students across all online examinations. In a second analysis, examination performances from one large online exam with over 500 students, where one half of students had to interrupt their exam for over ten minutes due to a temporary server malfunction while the other half was able to sit the exam uninterrupted, are compared with each other. The analyses results show effects of technical incidents on candidates' performance that either fail to reach statistical significance, or may be ruled out entirely. The measures and incident handling procedures are reviewed and implications of the study results for (computer based) examination practice are discussed.

Educational Equality in Schools

Quantitative methods,Teaching/instruction,Competencies,Mathematics,Reading comprehension

Max Nachbauer, University of Bamberg, Germany;

The dissertation project addresses educational effectiveness in regard to educational equality. Altogether, three indicators for educational effectiveness, which refer to specific goals of instruction, are analyzed. Two indicators relate to educational equality. These are the reduction of differences in the competence levels of students and the reduction of the correlation between students' competencies and their social background. The third indicator is the promotion of students' competencies, thus the most common indicator for educational effectiveness. It will be examined whether these three goals are compatible or conflicting. Concerning the two indicators for educational equality, the underlying mechanisms will be analyzed. Furthermore, the essential educational characteristics of classes in which these goals are achieved will be identified. Depending on the examined type of school, either data from the study BiKS (primary school) or data from the study NEPS (secondary schools) will be taken as a basis for the empirical analyses.

Provision of structure in academic tasks and students perception of the learning environment

Mixed-method research,Student learning,Cognitive skills,Mathematics,Secondary education,Problem-based learning

Sonia Abrantes Garcez Palha, University of Amsterdam, Netherlands; Jaap Schuitema, University of Amsterdam, Netherlands; Thea Peetsma, University of Amsterdam, Netherlands; Carla Van Boxtel, University of Amsterdam, Netherlands;

Academic achievements are the result of both high abilities and studentsí motivation. Students must be supported by a learning environment which challenges and motivates them. Characteristics of the learning environment that have been found to enhance student motivation and self-regulated learning include support for student autonomy, structure and collaborative learning tasks. In our research we conducted a study to investigate how the learning environment can support potentially high ability students in upper high school (16/17 years old). Two enriched learning arrangements have been developed for mathematics and history education. One condition includes more open tasks and the second more structured tasks. We investigate how the different learning arrangements affect studentsí perception of the instructional setting in mathematics.

Capturing communication supporting classrooms: The development of a tool and feasibility study

Quantitative methods,Instructional design,Educational attainment,Language (L1/Standard Language),Primary education

Julie Dockrell, Institute of Education, United Kingdom; Ioanna Bakopoulou, University of Warwick, United Kingdom; James Law, Newcastle University, United Kingdom; Sarah Spencer, Sheffield University, United Kingdom; Geoff Lindsay, University of Warwick, United Kingdom;

There is an increasing emphasis on supporting the oral language needs of children in the classroom. A variety of different measures have been developed to assist this process but few have been derived systematically from the available research evidence. A Communication

Supporting Classrooms Observation Tool (CsC Observation Tool) for Reception and Key Stage 1 classrooms was devised following a review of the research literature. The evidence derived from sixty-two research papers was rated based on the studiesí research design following specific rating criteria. Based on the review of the literature and rating of the evidence, three main areas were identified and included as dimensions in the CsC Observation Tool: Language Learning Environment, Language Learning Opportunities and Language Learning Interactions. A feasibility study was carried out in 101 different classrooms in 39 different schools across 10 local authorities. The different dimensions of the tool were then compared. The results suggested that the CsC Observation Tool discriminated well between different age groups within the sample and between different schools. In addition, significant differences were found across the three dimensions of the CsC Observation Tool. For all year groups, scores for the Language Learning Environment dimension were significantly better than scores for Language Learning Interactions and scores for the Language Learning Interactions dimension were significantly higher than those for the dimension of Language Learning Opportunities. The study provided evidence for using the Tool in schools to support training and development. The tool the potential to be used as a key feature in universal intervention studies to promote oral language in the classroom.

I 10

27 August 2015 15:45 - 17:15

Room Green_A1

Thematic Poster

Learning in context

Learning in context and learning approaches

Keywords: Qualitative methods,Second language acquisition,Student learning,Language (Foreign and second),Out-of-school learning,Learning in context,Quantitative methods,Pre-service teacher education,Learning approaches,Higher education,Emotion and cognition,Science education,Motivation and emotion,Case studies,Assessment methods and tools,Competencies,Interdisciplinary,Secondary education,Social development,Social sciences,Early childhood education,Primary education

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 4 - Higher Education,SIG 5 - Learning and Development in Early Childhood,SIG 7 - Learning and Instruction with Computers,SIG 8 - Motivation and Emotion

Chairperson: Kaisu Malkki, University of Helsinki, Finland

Personal English Learning Ecologies and Digital and Non-digital Artefacts In and Out of School

Qualitative methods,Second language acquisition,Student learning,Language (Foreign and second),Out-of-school learning,Learning in context

Michel Cabot, Stord/Haugesund University College, Norway;

Learning ecologies are found to have impact on school achievements in English. The main purpose of this study is to map the self-perceived importance of encounters with the English language in and out of school for the development of agency and English learning ecologies. This paper is based on a descriptive qualitative study. Focus interviews, in-depth interviews and member checking with three boys and three girls were carried out. The study draws upon a socio-cultural and ecological framework, in particular on theories of agency which is developed over time and between different interactive contexts. The male students said they developed more speaking skills out of school. All informants considered the writing skills as a challenge. The informants did not comment negatively on deliberate learning and grammar teaching. All female students commented positively on vocabulary tests. Based on these findings, school seemed to be important for the metalinguistic function, the hypothesis formulation and testing. Asymmetric interactions characterised most self-perceived ecological transitions in and out of school. An important implication of this study is that school has a complementary function to out-of-school learning. In the cases of writing skills, metalinguistic function of output and deliberate learning school has even a compensatory function.

Learning patterns, personal and contextual factor on Spanish and Latin-American undergraduates

Quantitative methods,Pre-service teacher education,Student learning,Learning approaches,Higher education,Learning in context

Laura Garcia Ravida, Universitat Autonoma de Barcelona, Spain; J. Reinaldo Martinez-Fernandez, Universitat Autonoma de Barcelona, Spain;

The aim of this study was to discuss the learning patterns model defined by Vermunt (1998, 2005) in relation to some personal and contextual factors. Four different explorations based on research development by Martinez-Fernandez and Vermunt (2013) about learning patterns were conducted. Methodology: 456 teacher education undergraduates from Colombia, Mexico, Spain and Venezuela completed a Socio-demographic questionnaire and the Inventory of Learning Styles (ILS). Findings: We observed four pattern: meaning-directed (MD) with external regulation; reproduction-directed (RD) with certain combination of the undirected (UD) pattern; a specific factor that grouped all conceptions of learning, typical of a passive-idealistic (PI) pattern; and finally, the last factor is defined like vocational (VO) pattern. Regarding personal and contextual factors some differences were found. In this sense, we found that GPA and personal factors were more relevant than contextual factors in relation to learning patterns identified. Thus, the MD show differences according gender, effort and GPA; while the RD/UD show differences linked with age, specific domain, GPA and teaching perception. Taking into account these findings, we need a deeper theoretical discussion about learning processes from a cross cultural dimension. Particularly, considering Vermunt model it appears that combination between components can be different according some personal and contextual factors. We

believe that this discussion is important on tertiary education context and more especially on teacher education since they will be future educators.

Physical space as anchor of meanings in learning: Psychological needs and transformation of subject

Qualitative methods,Student learning,Emotion and cognition,Science education,Higher education,Motivation and emotion

Kirsi Sjoblom, University of Helsinki, Finland; Kaisu Malkki, University of Helsinki, Finland; Kirsti Lonka, University of Helsinki, Finland;

Despite the fact that learning environments have been increasingly taken into consideration in research on learning, the role of physical learning environment has nevertheless remained rather unexplored. In this study we approach the questions of well-being and study performance with regard to physical learning environment, from the perspective of the basic psychological needs as laid out by the self-determination theory of motivation. We aim at bringing the interactional perspective of the theory further by considering also the role of physical environment in fulfillment of the core needs. In order to deepen our examination on learning process and well-being with regard to physical space and basic psychological needs, we use the theory of transformative learning involving concepts of meaning perspective and reflection. These allow a more detailed analysis of the nature of the assumptions an individual associates to her surroundings. With these theoretical tools, we approach the empirical data, in order to identify helpful and challenging aspects of physical environment with regard to learning as well as shed light on the dynamics underlying them. We focus on beginning university chemistry studentsí learning in laboratory. In our paper we will examine in more detail how the meanings conveyed by the space are related to the student experiences of the basic psychological needs. Furthermore, we will reflect on the relations between self determination theory and transformational learning theory and present directions for further research on the interface both from empirical and theoretical perspective.

Designing and testing ePortfolio models in lower secondary education in Cyprus: EUFolio project

Case studies,Assessment methods and tools,Competencies,Learning approaches,Interdisciplinary,Secondary education

Anastasia Economou, Cyprus Pedagogical Institute, Cyprus; Antri Avraamidou , Cyprus Pedagogical Institute, Cyprus;

While many educational systems are currently redesigning their curriculum to include key competences necessary for the 21st century society, gaps still exist in terms of the methods and approaches to develop and assess the transversal skills of learners. The EUfolio project aims at defining an ePortfolio model and testing its potential in fostering the development and assessment of 21st century skills. Research-based implementation of the model has been taking place in two phases, during which teachers participated in training workshops and then

implemented ePortfolio models in their classrooms. Schools were selected to participate in the pilot implementation after an open call. A mixed methods approach has been designed for the collection of data from each case study, while each school is considered as an embedded multiple-case study. Analysis and discussion of data for the purpose of this poster will refer to the impact of using ePortfolio on teaching, learning and assessment in lower secondary education in Cyprus. Anticipated results are expected to contribute in the growing discussion around the development and assessment of transversal skills and encourage the emergence of innovative learning practices.

Cross-institutional educational settings and socioemotional development during transition to school

Quantitative methods,Student learning,Social development,Social sciences,Early childhood education,Primary education

Anika Fasche, Ulm University, Germany; Nicole Sturmhofel, University of Ulm, Germany; Petra A. Arndt, University of Ulm, Germany;

Socioemotional competences (e.g., skills that enable children to initiate friendships and resolve conflicts respectfully) are considered to be crucial for individual well-being throughout life. During childhood experiences in interactions with peers have lasting impact on childrenís socioemotional development. The transition to elementary school further places high demands on childrenís socioemotional competences. Cross-institutional and age-mixed learning and play opportunities might support childrenís socioemotional development and help them to successfully master the transition to school. Little is known about the efficiency of such programs. The present investigation, funded by the BMBF and the ESF of the EU, used data from the project ìBildungshaus 3 ñ 10î in Germany. Here regular joint educational sessions for elementary and preschool children were provided by teachers from both institutions. The investigation examined socioemotional competences and school-related experiences before and after the transition to school. It focused on differences between children with and without participation in the ìBildungshaus 3 ñ 10î project. Influences of structural features of the project implementation were also investigated. Preliminary results showed that children from project institutions were reported to have less interpersonal skills and lower task orientation at end of preschool compared to the control group. Project participants also reported higher academic self-perception in first grade. Features of the project implementation design were differentially related with childrenís socioemotional competences and school-related experiences. Implications of the results will be discussed regarding their importance for future research and application in promoting childrenís mastery of the transition to school.

I 11

27 August 2015 15:45 - 17:15

Room Green_A5

Thematic Poster

Mathematics education

Mathematics education

Keywords: Experimental studies,Learning disabilities,Numeracy,Mathematics,Early childhood education,Researcher education,Cognitive development,Competencies,Learning and developmental difficulties,Teaching/instruction,At-risk students,Cognitive skills,Student learning,Learning approaches,Higher education,Problem-based learning,Neuroscience,Developmental processes,Primary education,Misconceptions,Secondary education,Game-based learning

Sig's: SIG 14 - Learning and Professional Development,SIG 22 - Neuroscience and Education,SIG 5 - Learning and Development in Early Childhood,SIG 6 - Instructional Design,SIG 7 - Learning and Instruction with Computers

Chairperson: Beatriz Vargas Dorneles, Universidade Federal do Rio Grande do Sul, Brazil

Number sense in children with Developmental Coordination Disorder

Experimental studies,Learning disabilities,Numeracy,Mathematics,Early childhood education

Karolien Smets, KU Leuven, Belgium; Ann-Sophie Deweer, KU Leuven, Belgium; Bert Reynvoet, KU Leuven Kulak, Belgium;

Children diagnosed with Developmental Coordination Disorder (DCD) often experience comorbid mathematical difficulties, which may in turn be due to a deficit number sense. The current study explored this possibility by investigating number sense of children with DCD by means of several different tasks. Results indicated no significant differences between DCDs and controls on the majority of these number sense tasks (non-symbolic and symbolic comparison, a subitizing task and a symbolic number-to-position number line estimation task). However, with respect to performance on the non-symbolic number-to-position number line estimation task, children with DCD were significantly worse at locating numerosities on the middle of a number line than controls were. Considering the strong influence of proportion judgment and visuo-spatial skills in this task, we propose that these specific capacities may be what is important to excel at mathematics. Our research further supports educational initiatives focusing on the improvement of especially non-symbolic number line estimation skills as a means to increase mathematics achievement in children.

A study for predicting early numeracy skills based on structural equations

Researcher education,Cognitive development,Competencies,Learning and developmental difficulties,Numeracy

Estibaliz Aragon, University Cadiz, Spain; Manuel Aguilar-Villagran, University of Cadiz, Spain; Jose I. Navarro-Guzman, University of Cadiz, Spain; Gamal Abdel Cerda, University Concepcion, Chile; M. Carmen Canto, University of Cadiz, Spain;

Early numeracy skills can be predicted from several higher cognitive processes at early ages. The objectives of this study are establishing a cognitive profile in order to explain the potential predictive role of higher cognitive processes in early numeracy skills, and presenting a predictive model based on structural equations. This evidence may be particularly relevant in the detection and support of pupils who show low mathematical competence. Participants were 207 pupils in their last year of Preschool Education, ages ranged from 59 to 72 months. Early numeracy skills, fluid intelligence, emergent literacy, short term memory and working memory were assessed. Results suggested that the variance in early numeracy skills could be partially explained by the cognitive variables introduced in a structural equations model. This model predicted 64.3% of the variance in explaining early numeracy skills.

Is the Number Knowledge Test a good tool to identify difficulties in arithmetic?

Experimental studies,Teaching/instruction,At-risk students,Cognitive skills,Numeracy,Mathematics

Luciana Corso, Federal University of Rio Grande do Sul -UFRGS, Brazil; Beatriz Vargas Dorneles, Universidade Federal do Rio Grande do Sul, Brazil;

Abstract There is a growing evidence that children with arithmetic problems have a central difficulty with the number sense. There is much controversy related to the instruments used to assessment it. The Number Knowledge Test (Okamoto & Case, 1996) is pointed by the literature as a good tool to assess number sense. The goal of this study is to verify if this test is a sensitive instrument to identify number sense problems in different achievement groups. The study involved 79 Brazilian students from the 3rd to the 6th year of elementary school who were divided into four groups, considering the School Achievement Test (Stein, 1994): AD (arithmetic difficulties), RD (reading difficulties), AD+RD (arithmetic and reading difficulties) and control group. The Number Knowledge Test was the instrument used to assess number sense. The students with AD showed lower performance in this test, as compared to the control group, although this difference did not reach statistical significance level. The students with AD+RD showed a significant poor performance on the Number Knowledge Test. As it was hypothesized, the RD group did not show difficulties with the number sense task. The results were discussed based on conceptual and methodological issues. The study found that this test is a good instrument to assess some aspects of number sense, but not all. It emphasized that if we are to improve the nature of the instruments for assessing number sense, we need to better refine and operationalize this concept first.

Enough for Some, Too Much for Others: The role of working memory in math learning

Experimental studies,Student learning,Learning approaches,Mathematics,Higher education,Problem-based learning

Amira Ibrahim, University of Michigan, United States; Priti Shah, University of Michigan, Ann Arbor, United States;

Learning new mathematics concepts relies heavily on working memory (WM). In order to develop effective learning strategies for mathematics it is important to consider not only the WM load being imposed by learning materials, but also individual differences in WM capacity. Previous evidence suggests that instructional materials that minimize WM load, such as worked examples, support learning of mathematics content. However, contrasting findings suggest that learning strategies that impose a greater WM load can sometimes act as a ìdesirable difficultyî that promotes long-term retention. In this study we assess the short and long-term benefits of studying worked examples versus active problem solving in learning base number conversions as well as the interactive effects of individual differences in WM capacity on the effectiveness of these two learning strategies. We hypothesize that worked examples will positively affect performance on an immediate test but not at a one week delay, but that active problem solving will enhance performance at the delay. In addition, we predict that worked examples will be more beneficial for individuals with low WM capacity and high math anxiety and active problem solving will be more beneficial for individuals with high WM capacity and low math anxiety. Participants were randomly assigned into worked example or active problem solving groups. After an initial learning phase, participants were given an immediate test consisting of eight base number conversion problems; subjects returned after one week to complete a follow up test, a WM capacity measure, and a math anxiety questionnaire.

Longitudinal change patterns in childrenís non-symbolic and symbolic magnitude representations

Neuroscience,Cognitive development,Developmental processes,Numeracy,Mathematics,Primary education

Cindy Chew, University of Melbourne, Australia; Robert Reeve, University of Melbourne, Australia;

The speed and accuracy with which children compare non-symbolic quantities and Arabic digits correlates with and predicts their math abilities. The claim that magnitude representations is foundational for early math competence is predicated in part on the assumption that non-symbolic magnitude (NSM) representation supports the acquisition of symbolic (SM) (i.e., Arabic digits) representation. Most tests of this claim are based on inferences drawn from cross-sectional research, and little is known about the stability and/or changes in NSM/ SM patterns over time. Insofar as different NSM/SM developmental change patterns can be identified, they have implication for the diagnosis and remediation of childrenís math difficulties. To investigate these issues, we analysed the NSM/SM abilities of 5- to 7-year-olds on two test occasions, one year apart. We were interested in (1) patterns of change in NSM/SM magnitude representations abilities, (2) cognitive correlates of NSM/SM change patterns, and (3) whether math abilities were associated with NSM/SM change patterns. Latent Transition Analysis of the speed and accuracy of T1 to T2 NSM/SM comparison abilities revealed five developmental change patterns. Visuo-spatial working memory and Arabic digit naming speed abilities at T1 predicted subgroup membership at T2. These findings show that different NSM/SM change patterns are embedded within the overall pattern of NSM/ SM judgments and that these are associated with different cognitive and math abilities. They also caution against accepting a general model of

NSM/SM development, and highlight the need to focus on individual differences in the acquisition of math abilities.

The Rational Number Navigation Game - A Serious Game for Developing Rational Number Knowledge

Student learning,Misconceptions,Numeracy,Mathematics,Secondary education,Game-based learning

Konstantinos Christou, University of Western Macedonia , Greece; Jake McMullen, University of Turku, Finland; Wim Van Dooren, KU Leuven, Belgium; Lieven Verschaffel, KU Leuven, Belgium; Erno Lehtinen, University of Turku, Finland;

Students struggle with understanding many aspects of rational numbers. Serious games may foster learning about rational numbers if they are designed to focus on the characteristics of rational numbers that are most hampering to students. The Rational Number Navigation Game is an educational computer-based digital game that aims to be a learning environment where students may practice their rational number knowledge and discover novel characteristics of the properties of rational numbers and their relations. It uses the external representation of the number line in a realistic context in which students may have repeated experiences with operations between rational numbers, and more specifically with positive decimal numbers. The main interface of the game environment is a network of (numbered) city pipelines in which cracks appear in certain positions. The players must use operations with natural and/or rational numbers to navigate a robot that moves inside the pipes in order to approach the damaged areas and fix the crack. The player progresses in the game only by completing arithmetic operations, in a way that integrates the educational content and the core game mechanics i.e., the mechanisms through which players progress in the game. The design of the game addresses the main differences between natural and rational numbers that are particularly troublesome for the students, in particular the ways of ordering rational numbers, the density of their structure, and the effects of the operations on rational numbers. A pilot study with a preliminary version of the game will be presented.

I 12

27 August 2015 15:45 - 17:15

Room Green_A7

Thematic Poster

Reading comprehension

Reading comprehension

Keywords: Mixed-method research,Teaching/instruction,At-risk students,Comprehension of text and graphics,Literacy,Reading comprehension,Experimental studies,Student

learning,Achievement,Science education,Primary education,Quantitative methods,Attitudes and beliefs,School effectiveness,Educational attainment,Cooperative/collaborative learning

Sig's: SIG 1 - Assessment and Evaluation,SIG 2 - Comprehension of Text and Graphics,SIG 21 - Learning and Teaching in Culturally Diverse Settings,SIG 23 - Educational Evaluation, Accountability and School Improvement,SIG 25 - Educational Theory

Chairperson: Birgit Heppt, Humboldt-Universitat zu Berlin, Germany

Subject area literacy instruction in low SES secondary schools in NZ

Mixed-method research,Teaching/instruction,At-risk students,Comprehension of text and graphics,Literacy,Reading comprehension

Aaron Wilson, University of Auckland, New Zealand; Stuart McNaughton, The University of Auckland, New Zealand; Victoria Cockle, University of Auckland, New Zealand; Tong Zhu, University of Auckland, New Zealand;

In this paper we examine the properties of literacy instruction in senior English, biology and mathematics classes in 26 low socio-economic status (SES) secondary schools in New Zealand (NZ). It has become increasingly clear that there are both generic and specific forms of literacy associated with specialised subject areas and that developing studentsí competence in these has the potential to improve studentsí reading and writing and their subject achievement overall. We hypothesised that current patterns of subject-area literacy teaching might contribute to well-documented inequities in education achievement for Maori (indigenous), Pacific Islands and low ñSES students in NZ. A total of 103 lessons were observed using a template designed to record instances of literacy teaching. The observations comprised 39 English, 36 mathematics and 28 biology lessons. Details recorded included properties of texts used, teaching activities, how students were grouped, forms of differentiation, and the focus and characteristics of any literacy instruction. Every alternate three minute block was observed providing a 50% sampling of each lesson. Results indicate that students had comparatively few opportunities to read longer, more complex subject-area texts and that instructional approaches commonly cited in the literature as effective in raising studentsí subject area literacy, strategy instruction and extended discussion, were infrequently observed in this study. Infrequent too were teaching about language features (such as nominalisation) in mathematics or biology lessons and teaching to develop studentsí critical literacy.

Gender Differences in Reading: The Neglected Role of Stereotype Threat

Experimental studies,Student learning,Achievement,Science education,Primary education

Pascal Pansu, Universite Grenoble Alpes, France; Isabelle Regner, University of Aix-Marseille, France; Sylvain Max, ESC Dijon Bourgogne , France; Pascal Huguet, University of Aix-Marseille, France; Pascale Cole, University of Aix-Marseille, France;

Stereotype threat (ST) has been proposed as a potential explanation for gender differences favoring boys on standard math tests. Here, we examine whether ST may also contribute to explain gender differences favoring girls on reading tests, assuming that boys are negatively stereotyped in the verbal domain. Eighty students (3rd grade) took a reading test while being assigned to either a threat or a reduced-threat condition. In the threat condition, the test was presented as diagnostic of reading abilities, whereas in the reduced-threat condition the test was presented as a game. In the threat condition boys underperformed relative to girls, whereas the reverse was found in the reduced-threat condition. Consistent with ST theory, this pattern was obtained only among highly-identified students. These findings allow a new look at the well-known gender gap favoring girls in reading, which is three times bigger than the gender gap favoring boys in math (OECD, 2010).

Studentsí text comprehension skills and teachersí preferences for instructional methods

Quantitative methods,Teaching/instruction,Achievement,Reading comprehension,Primary education

Krista Uibu, University of Tartu, Estonia;

Text comprehension depends on the readerís cognitive skills as well as on the teaching methods chosen by the teacher. The purpose of the present study was to find out about the studentsí text comprehension skills and their changes in Grades 4 and 5 as well as about the teachersí preferences for teaching methods. Six hundred and six students and their 39 Estonian language teachers participated in this study. The studentsí higher level text comprehension skills were analysed together with their teachersí preferences for different teaching methods. The findings indicated that fewer than half of the students examined succeeded in analysing and evaluating the content of the text, while the studentsí higher level text comprehension skills in Grade 5 were clearly better than in Grade 4. Students who analysed the text better were also better at evaluating it. While comparing the students whose teachers had different methodological preferences (e.g., combined or progressive methods), it was concluded that students did not show any statistically significant difference in text analysis and evaluation skills. From the study it may be concluded that teachers should pay special attention to developing the studentsí cognitive skills, which are important for comprehending the text on a higher cognitive level. It is important that the teaching methods that teachers choose consider childrenís individual peculiarities and support their text comprehension skills.

Belief Change: A function of multiple texts and prior beliefs

Experimental studies,Quantitative methods,Attitudes and beliefs,Comprehension of text and graphics,Reading comprehension

Sylvia Savvidou, University of Cyprus, Cyprus; Irene-Anna Diakidoy, University of Cyprus, Cyprus;

In the present study, we sought to examine the influence of text characteristics and prior beliefs about veganism in memory and situation model of texts, judgment of texts' trustworthiness,

multiple text comprehension, and belief change. Text characteristics included different argument (concrete-emotional vs objective-rational) and claim (against vs in favor) types. Analyses of preliminary data showed that, after readings, participants changed their initial positive belief and adopted a more negative one. Also, both argument and claim text characteristics influenced memory and situation model of texts, judgment of texts' trustworthiness and belief change. The role of prior beliefs was significant only in belief change. Single text comprehension outcomes and prior beliefs didn't significantly predict multiple text comprehension.

What makes a difference between poor and good readers?: Environmental and psychological factors

Quantitative methods,Literacy,Reading comprehension,Primary education

Agnes Hodi, MTA-SZTE, Hungary; Maria B. Nemeth, University of Szeged, Hungary; Erzsebet Korom, University of Szeged, Hungary; Edit Toth, MTA-SZTE Research Group on the Development of Competencies, Hungary;

Data from cross-sectional reading literacy assessments show that a sizeable percentage of Hungarian students experiences reading difficulties. However, no information is available on these studentsí reading trajectory or whether poor readers fall further and further behind their more literate peers. Moreover, the extent to which demographic data, the home and school environment and school-related psychological factors predict the development of students with different reading skills in a Hungarian context is yet unclear. The present study aims at bridging this gap. Data gained from our longitudinal study provides unequivocal proof that one-sixth of students do not only experience problems in reading temporarily but keep facing further reading difficulties over time. The possibility of having poor or good reading achievement may be predicted by two factors unrelated to schooling (parental education, financial capital) and two school and teaching-learning process related (academic self-concept and motivation, school activities supporting learning) factors.

Improving reading literacy of elementary students: Effects of two competing intervention programs

Quantitative methods,School effectiveness,Educational attainment,Science education,Primary education,Cooperative/collaborative learning

Helvi Koch, Universitat Potsdam, Germany; Nina Schuenemann, Justus Liebig University Giessen, Germany; Stefanie Bosse, Universitat Potsdam, Germany; Nadine Sporer, University of Potsdam, Germany;

The aim of this longitudinal study was to examine the effects of two different teacher-led classroom reading literacy interventions in comparison to traditional literacy instruction. One intervention was reciprocal teaching combined with specific self-regulation procedures (RT+SRL). The second intervention was a so called good-practice program (GP) that was designed by teachers. Both interventions were strategy orientated programs to improve the reading competence of elementary students. In total there were N = 244 fifth grade students

taking part in this study. In both intervention programs the students were taught several reading strategies. While in RT+SRL four strategies (summarizing, questioning, clarifying, predicting) were practiced in reciprocal peer-assisted small group discussions, the GP students learned more reading strategies and moreover, there was a variety of social form and teaching methods observed in this condition. To evaluate the effect of the treatment we used standardized tests and experimenter-developed reading tasks. The study involved a pretest, posttest, and maintenance test design. At posttest students in the two intervention conditions (RT+SRL and GP) outperformed comparison students in measures of reading comprehension, strategy related task performance, and metacognitive reading awareness. Whereas students of the condition RT+SRL had significantly better results in reading comprehension at posttest and in self-efficacy for reading, and metacognitive reading awareness at maintenance than students of the condition GP.

I 13

27 August 2015 15:45 - 17:15

Room Green_A2

Thematic Poster

Science education

Science education

Keywords: Instructional design,Synergies between learning, teaching and research,Argumentation,Science education,Primary education,Case studies,Qualitative methods,Assessment methods and tools,Cognitive skills,Metacognition,Experimental studies,Student learning,Comprehension of text and graphics,Multimedia learning,Conceptual change,Biology ,Quantitative methods,Teaching/instruction,Reflection,Lifelong learning,Learning approaches,Higher education

Sig's: SIG 16 - Metacognition,SIG 2 - Comprehension of Text and Graphics,SIG 26 - Argumentation, Dialogue and Reasoning,SIG 3 - Conceptual Change,SIG 7 - Learning and Instruction with Computers

Chairperson: Anne Roth, TU Darmstadt, Germany

Promoting Argumentation through CHAT: Engaging Stakeholders in the Design of Learning Activities

Instructional design,Synergies between learning, teaching and research,Argumentation,Science education,Primary education

Demetris Lazarou, Ministry of Education and Culture, Cyprus;

In Science Education research, argumentation is considered to be a core skill for students to attain, as it can empower them to enhance, amongst others, their reasoning skills and to attain scientific literacy. From a cultural perspective, even though certain concerns are raised concerning the active engagement of stakeholders (e.g., science inspector, teachers and students) in the design of learning activities aimed at argumentation, existing research does not seem to adequately address this issue. This paper argues that Cultural-Historical Activity Theory (CHAT) can provide an appropriate framework for promoting argumentation in primary Science Education by actively engaging stakeholders in the design of learning activities. The expansive learning theory, the notion of the activity system and the notion of contradictions were the main theoretical, methodological and analytical tools that guided the research process. The findings of the research focus on describing the learning actions of the expansive learning cycle when various stakeholders were involved in a two-year research project and on noting any instances of expansive learning that may have occurred. Implications for educators, policy makers and professional development coordinators are also being illustrated.

How can meta-cognitive reflective process help high school biology students use ësystems languageí?

Case studies,Qualitative methods,Assessment methods and tools,Cognitive skills,Metacognition,Science education

Orit Ben Zvi-Assaraf, Ben Gurion University of the Negev, Israel; Jaklin Tripto, Ben-Gurion University of the Negev , Israel; Zohar Snapir, Ben-Gurion University of the Negev , Israel; Miriam Amit, Ben_Gurion University, Israel;

Program for Science and Technology Education Ben-Gurion University of the Negev, Israel.
One of the major issues affecting students' ability to learn about complex systems is their cognitive, meta-cognitive, and self-regulatory process. This study examined the meta-cognitive reflection interview, as a tool for assessing the use of ësystems languageí amongst students who have completed their first year of high school biology. The eighty three students participating in this study created two concept maps during their first year of biology studies (10th grade) - one at the beginning of the school year and one at the end of the school year. Later on, they play a part in a semi-structured meta-cognitive reflective interview. The reflective process helped students identify gaps in their understanding of the human body as a system. The studentsí perception of which patterns are relevant as indicators of system complexity are evident in the fact that their explanations referred to the patterns hierarchy and homeostasis whereas, dynamism was not mentioned.

Pretraining effects on cognitive load in authentic settings when learning complex science ideas

Experimental studies,Student learning,Comprehension of text and graphics,Science education,Multimedia learning

Carolyn Haslam, University of Auckland, New Zealand; Richard Hamilton, University of Auckland, New Zealand;

High cognitive load is often a consequence of learning complex ideas in science. One approach to reducing cognitive load when learning complex material is ìpretrainingî which involves the presentation of the information essential for understanding the concepts in two stages: Stage 1 - present names and characteristics of the main parts or ideas to provide the learners with some prior knowledge but no understanding of the concepts; Stage 2 - present material required for full understanding of the concepts. This study assessed the impact of pretraining on the efficiency of learning of basic graphing skills and complex physics concepts within actual classrooms. 495 students participated in this study and were given either pretraining and a power-point presentation, just the power-point presentation, or the power-point presentation twice. The pretraining group reported lower subjective cognitive load scores, greater improvement from pre to posttest and greater efficiency in learning (i.e., effective use of mental effort while learning) than the other two treatments. This supports the usefulness of pretraining as a strategy to reduce cognitive load and enhance learning within authentic settings.

Characterizing the Development of Understanding Human Body Systems in High School Biology Students

Qualitative methods,Student learning,Cognitive skills,Conceptual change,Biology ,Science education

Orit Ben Zvi-Assaraf, Ben Gurion University of the Negev, Israel; Zohar Snapir, Ben Gurion University, Israel; Catherine Eberbach, Indiana University, United States; Cindy Hmelo-Silver, Indiana University, United States; Jaklin Tripto, Ben Gurion University of the Negev, Israel; Miriam Amit, Ben_Gurion University, Israel;

Science education is increasingly focused on the instruction and learning of complex systems, such as the human body. In this study, we examined the development of high school biology students systems understanding of the human body, in a three-year longitudinal study. To trace the learning trajectories of the students, we adapted the Component-Mechanism-Phenomena model. The tool for data collection in this study was the Repertory Grid technique that can help identify the level of system understanding. We coded and analyzed the personal constructs of sixty-seven high school biology students four times over the study. The constructs were coded into the level of components, mechanisms, or phenomena. Our findings suggest that there is an increase in the level of systems understanding of the human body in the students, showing a shift from simpler CMP categories at the beginning of the study to more complex categories at its end.

The Effects of Feedback and Medical Expertise on Diagnostic Calibration Accuracy

Quantitative methods,Teaching/instruction,Metacognition,Reflection,Science education,Lifelong learning

Marloes Nederhand, Erasmus University Rotterdam, Netherlands; Huib Tabbers, Erasmus University Rotterdam, Netherlands; Ted Splinter, Erasmus Medical Center, Netherlands; Remigius (Remy) Rikers, UCR / Utrecht University, Netherlands;

In this study, calibration accuracy is investigated in medicine. Calibration accuracy is defined as the correctness of the estimations people make about their own performance. Previous studies have shown that physicians tend to overestimate their actual diagnostic performance, which means that they do not calibrate accurately. Being capable of providing a good estimation of own performance is however especially important in medicine. Mistakes or accurate actions that were taken into doubt, can both lead to harm to the patient and high health care costs. The present study therefore investigated how calibration accuracy can be improved. In particular, this study investigated whether calibration accuracy improves when experienced physicians (n = 43) and students (n = 44) solve written clinical cases after a training phase in which they received or did not received feedback on their diagnostic performance. During the test phase, none of the participants received feedback and their calibration accuracy is tested. Findings indicated that getting feedback on performance was not related to calibration accuracy. In addition, experts did not differ from students in how well they could estimate their own performance and, moreover, they did not seem to respond differently on getting diagnostic feedback than students. Possible explanations and implications are discussed.

The Value of Using Agent-Based Models For Learning About Nanotechnology

Experimental studies,Teaching/instruction,Learning approaches,Science education,Higher education,Multimedia learning

Polly (Kuanling) Lai, The University of Sydney, Australia; Michael Jacobson, The University of Sydney, Australia;

An important new area of science and engineering relates to nanoscience and nanotechnology, which has been defined as ìthe emerging capability of human beings to observe and organize matter at the atomic level." The purpose of this study is to report on a study that involves a technology enabled learning approach informed by perspectives from embodied cognition. It aimed at enhancing studentsí understanding of the difficult concepts taught in undergraduate nanotechnology curricula, such as size-dependent property. The research compared learning outcomes associated with two different technology systems: an experimental group using an Embodied Cognition Agent-Based Modelling (ECABM) approach with agent-based computer models and a comparison group using a Non-Embodied Cognition Visualisation (NECV) approach with multi-media visualisations. Implications for nanotechnology education are considered. Preliminary findings indicate that the experimental ECABM group made greater gains from the pretest to the posttest on procedural knowledge and knowledge transfer items than the NECV comparison group.

I 14

27 August 2015 15:45 - 17:15

Room Brown_B3

Thematic Poster

Science education

Science education, inquiry learning, classroom discourse

Keywords: Experimental studies,Instructional design,Cognitive skills,Science education,Primary education,Inquiry learning,Meta-analysis,Student learning,Metacognition,E-learning/ Online learning,Conversation/ Discourse analysis,Peer interaction,Reading comprehension,Qualitative methods,Pre-service teacher education,Conceptual change,Physical Sciences,Higher education

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 20 - Computer Supported Inquiry Learning,SIG 3 - Conceptual Change,SIG 6 - Instructional Design

Chairperson: Alaric Kohler, HEP-BEJUNE, University of teacher education, Switzerland

Intervention Study on Theory-Inspired Questions as an Epistemic Activity in Science

Experimental studies,Instructional design,Cognitive skills,Science education,Primary education,Inquiry learning

Miki Sakamoto, Kobe University, Japan; Etsuji Yamaguchi, Kobe University, Japan; Isao Murayama, Shizuoka University, Japan; Sakiko Nakashin, Tidorigaoka Elementary School, Japan; Shinichi Kamiyama, Kobe University, Japan; Tomokazu Yamamoto, Hyogo University of Education, Japan; Keita Muratsu, Research Fellow of Japan Society for the Promotion of Science, Japan; Shigenori Inagaki, Kobe University, Japan;

Scientific reasoning and scientific argumentation are highly valued outcomes of K-12 education. One of the prototypical instructional approaches for scientific reasoning and argumentation is inquiry learning. This study focuses on questioning, one of the eight epistemic activities. It is not easy for students to generate scientific questions, and intervention studies focus on questioning, especially questions which are inspired by a theoryís predictions, are required. The purpose of this study is to examine the effect of comparing questions in inquiry learning to enhance theory-inspired questions among elementary school students. This instructional intervention comes from the findings that comparing correct and incorrect examples facilitate learning. Two hundred and thirty-two sixth-grade elementary school students were assigned to two instructional groups; inquiry learning with comparing questions (experimental group), and inquiry learning without comparison (control group). Students collaboratively engaged in inquiry learning in which they repeatedly explored and explained specific combustion phenomena based on the theory they learned. We used a pretestñinterventionñposttest design. The level of student-generated questions was compared between two instructional groups. The results from written assessment tasks revealed that students in the experimental group showed greater improvements from pretest to posttest than those in the control group. It suggested that inquiry learning which included comparing questions was an instructional intervention to promote theory-inspired questions among elementary school students.

A Revised Theoretical Framework of Inquiry-Based Learning Processes

Meta-analysis,Student learning,Metacognition,Science education,E-learning/ Online learning,Inquiry learning

Mario Maeots, University of Tartu, Estonia; Margus Pedaste, University of Tartu, Estonia;

Research on inquiry-based learning has often focused on supporting and developing studentsí inquiry skills and knowledge that are common for transformative and regulative processes. Less emphasis is placed on inquiry meta-processes. These processes are described as broader meta-level structure that helps students to understand how, when and why to activate particular transformative and regulative processes. Thus, there is a missing link in the general framework of inquiry-based learning processes, and a need for revising by integrating all inquiry-based learning processes that are studied separately by different authors. The general goal of the current study was to construct a theoretical framework of inquiry-based learning processes that would serve as a conceptual structure for showing how the three inquiry-based learning processesótransformative, regulative, and inquiry meta-processóare related to each other. The framework of inquiry-based learning processes was developed in synthesis of literature review and empirical evidence collected by developing and implementing the web-based learning environment Young Researcher (http://bio.edu.ee/teadlane/).

Reading comprehension and knowledge building during dialogic reading in studentsí inquiry projects

Conversation/ Discourse analysis,Student learning,Peer interaction,Reading comprehension,Primary education,Inquiry learning

Maaike Pulles, NHL University of Applied Sciences, Netherlands; Jan Berenst, University of Applied Sciences Leeuwarden , Netherlands;

In inquiry learning projects in primary schools, students use texts to answer their research questions and to build their knowledge about the subject theyíre inquiring. When they do this together, we talk about dialogic reading. In these discussions about texts, both reading comprehension and shared knowledge construction come together. But what makes these conversations special and how talking about texts contributes to knowledge building is not known yet. In this paper we present the results of qualitative analysis study on students discussion about texts informed by ethnographic and socio-cultural discourse analysis and by applied conversation analysis. We will show that these shared reading conversations differ from conversations without text on two main points. First, when the object of conversation is the content of a text, the text functions as a ëthird participantí in the conversation. Second, we will point out how inferences during the reading activity are made explicit in interaction and how these inferences contribute to knowledge building together with the inferences that are normally made in interaction with exploratory talk. The importance of these findings for ideas about cooperative learning will be discussed.

Changes of studentsí explanation models during DC-circuit interviews

Qualitative methods,Pre-service teacher education,Conceptual change,Physical Sciences,Higher education

Terhi Mantyla, University of Tampere, Finland; Tommi Kokkonen, University of Helsinki, Finland; Markus Mattila, University of Helsinki, Finland;

In this study, the changes in pre-service physics teachersí explanation models of brightnesses of the bulbs in DC-circuits were examined. The pre-service teachers participated in three small group interviews with several predict-test-explain-tasks. The interview transcripts were qualitatively analysed using content analysis. In categorizing the explanation models and further, in categorizing their explanation power, the scientific concepts and their relations were the distinctive feature. The changes of the explanation models of two students are presented. In the first case, there is a development towards a more scientific explanation. In the second case, the student already masters the topic. In his case, we see conceptual flexibility in the use of explanation models. The scientific concepts are core parts of explanation models and conceptual development requires learning to use the scientific concepts in relation to each other.

I 15

27 August 2015 15:45 - 17:15

Room Green_A4

Thematic Poster

Technology-enhanced learning

Technology-enhanced learning

Keywords: Mixed-method research,Educational technology,Instructional design,Pre-service teacher education,Science education,Technology,Quantitative methods,Mathematics,Higher education,Conversation/ Discourse analysis,Student learning,Teaching/instruction,Secondary education,Computer-supported collaborative learning,Experimental studies,Comprehension of text and graphics,Multimedia learning,Case studies,Achievement,Language (L1/Standard Language),Primary education,Self-regulation,Reading comprehension,Computer-assisted learning

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 6 - Instructional Design,SIG 7 - Learning and Instruction with Computers

Chairperson: Ina Blau, The Open University of Israel, Israel

Technology-enabled Constructivism: Adapting ScienceTeacher Education to 21st Century Skills

Mixed-method research,Educational technology,Instructional design,Pre-service teacher education,Science education,Technology

Miri Barak, Technion - Israel Institute of Technology, Israel;

Given the rapid changes in the way information is created and acquired, educational experts and policy makers have emphasized the need for enhancing 21st century skills among students, preparing them to work and learn in a transformative era. In light of the aforesaid, a sequential explanatory mixed methods study was set to identify attributes for learning and teaching in the 21st century and to develop a social constructivist pedagogical framework for promoting meaningful usage of advanced technologies. Quantitative and ualitative data were collected via an online survey, personal interviews, and written reflections, among teacher educators (n=63) and science student teachers (n=52). Findings indicated that teacher educators do not provide sufficient models for the promotion of reform-based practice via cloud applications or web 2.0 environments. Finding also indicated four attributes for teaching and learning in the 21st century: a. Adapting to frequent changes and uncertain situations, b. Collaborating and communicating in decentralized environments, c. Generating data and managing information, and d. Releasing control and encouraging exploration. Corresponding with the social constructivism theory and the four teaching attributes, this study suggests a pedagogical framework for fostering meaningful usage of advanced technologies in science teacher education courses.

Stat+: An enrichment of a learning environment for statistics

Quantitative methods,Educational technology,Mathematics,Higher education

Marieke Maertens, KU Leuven KULAK, Belgium; Mieke Vandewaetere, University of Leuven - Campus KULAK, Belgium; Eva Ceulemans, KULeuven, Belgium; Jan Elen, KU Leuven, Belgium; Andy Thys, KULeuven, Belgium; Wim Van Dooren, KULeuven, Belgium; Wim Van den Noortgate, KULeuven, Belgium;

The starting point for the ëStat+project: An enrichment of a learning environment for statisticsí are the negative attitude of part of the students towards an introductory course in statistics and the persistent misunderstandings about certain topics. By developing online support for introductory courses, we try to cater the two abovementioned problems and additionally illustrate the applicability of statistics. A modular and adaptive online learning environment based on the 4C/ID-model is developed on four difficult topics: (a) point estimates and sampling distribution, (b) interval estimates and significance tests, (c) statistical power and (d) a roadmap for statistical tests. Each module contains different learning tasks, supportive and procedural information, summative tests and a predetermined learning path. In the ëStat+projectí, we also investigate studentsí use of the modules. In addition, we want to investigate the effect of using the modules on studentsí attitudes towards statistics and performance. The project is conducted in three introductory courses Statistics in the Bachelor of Psychology and Educational Sciences in two consecutive years; the first year without the modules and the second year with the modules. First, the log-data of studentsí behavior will be analyzed to get an insight into the (in)frequently used parts of the module and the difficulty of the different tasks. Additionally, a comparison will be

made between students of year 1 and year 2 for on the one side the attitudes towards statistics and on the other side the performance on a final.

Exploring teacher intervention in CSCL settings

Conversation/ Discourse analysis,Student learning,Teaching/instruction,Science education,Secondary education,Computer-supported collaborative learning

Anniken Furberg, University of Oslo, Norway; Torunn Aanesland Stromme, University of Oslo, Norway;

The aim of the current study is to provide insight into the teacherís role as facilitator in computer-supported collaborative learning (CSCL) settings in science. Several studies have provided valuable knowledge about how to support studentsí learning processes, either by means of computer support, peer collaboration, or various forms of instructional designs. In naturalistic classroom settings where students engage with computer-supported activities, the teacher most often represents an important resource, providing different forms of guidance during studentsí learning activities. Surprisingly few studies however, have focused on the role of teacher intervention in these types of settings. By performing detailed analyses of secondary school students and their teacherís interaction during a science project, the current study provides insight into opportunities and challenges witch the teacher encounter in facilitating studentsí development of conceptual understanding in CSCL-settings. The analyses display how teacher intervention constitutes pivotal ìglueî for enabling students to link and make use of coexisting support aspects such as peer-collaboration, digital tools and the instructional design. However, the study also shows the challenges and complexity involved in supporting studentsí learning processes in these types of settings.

Learning With Digital Textbooks: Investigating the Effectiveness of Signaling Text-Picture Relations

Experimental studies,Instructional design,Comprehension of text and graphics,Science education,Secondary education,Multimedia learning

Juliane Richter, Leibniz-Institut fur Wissensmedien, Germany; Alexander Eitel, Knowledge Media Research Center, Germany; Katharina Scheiter, Knowledge Media Research Center, Germany;

With the growing use of digital devices in education students increasingly use digital textbooks. Digital textbooks allow presenting relevant information using also dynamic and interactive representations. However, successful learning with digital textbooks requires integrating these multiple external representations into a coherent mental model. Unfortunately, students often fail in accomplishing this integration. Therefore, this study investigates whether signaling the relations between external representations can effectively guide students in this respect. Students of German high schools (N=128; Grade 8) learned with an evidence-based digital textbook unit about the Particle Model of Matters (PMM) during four school lessons in a classroom setting. They were randomly assigned to one of two versions of the digital textbook: a basic signaling

version including mainly text signals and an extended signaling version that additionally included signals highlighting correspondences between verbal and pictorial information. Studentsí prior knowledge (PK) levels were manipulated quasi-experimentally by picking classes either before (low PK) or after having regular school courses about the PMM (high PK). Learning outcomes were assessed via verification, multiple-choice and open questions, and drawing tasks. The extended signaling version was expected to lead to stronger knowledge gains from pre- to posttest than the basic signaling version because of its focus on supporting integration. Moreover, low PK students were assumed to benefit more strongly from the extended version than from the basic signaling version, since the former are likely to have greater difficulty to integrate. Data collection is currently ongoing and results will be presented at the conference.

Using tablets in a 1:1 program to develop 6th grade studentsí skills in producing multimodal texts

Case studies,Educational technology,Achievement,Language (L1/Standard Language),Primary education,Multimedia learning

Christina Kyrillou, Cyprus University of Technology, Cyprus; Iolie Nicolaidou, Cyprus University of Technology, Cyprus; Giorgos Konstantinidis, Kyperounta Primary School, Cyprus; Christos Lyssiotis, Kyperounta Primary School, Cyprus; Chrystalleni Lazarou, Kyperounta Primary School, Cyprus;

This research study investigates the effectiveness of a series of lessons using tablets as a 1:1 computing device (intervention) to assist 6th grade students in producing multimodal texts. A pre-post-test design was used in a case-study with 10 6th grade students (10-11 years old) who participated in a fourteen 80-minute lesson intervention specially designed to increase their skills in multimodal text production and assessment. The research question investigates how effective the proposed intervention was in developing 6th grade studentsí multimodal text writing skills. Every student was using his own device (1:1 model with Microsoft Surface RT tablets) to collect data (in the form of note taking, photos, voice recordings and video), to access information, to create a web-based multi-modal tourist guide and to evaluate peers asynchronously. Data sources included studentsí pre-post tests, semi-structured student interviews and studentsí artifacts. The poster reports on results from the analysis of pre-post tests. A Wilcoxon Signed-Ranks Test indicated that post-test ranks Mdn=58.1 were statistically significantly higher than pre-test ranks Mdn=28.6 z(10)=-2.8, p.01 on a composite score derived from a 19-item questionnaire assessing multimodal text production skills (effect size=0.63). These results provide evidence of the effectiveness of the intervention. While empirical and scientific research worldwide on the effective implementation of mobile devices in a 1:1 learning model in primary education is in early stages, the present research aims to add to the empirical literature by enhancing our understanding of the use of tablets as learning tools in primary education.

Effects of an intervention with TuinLECweb on reading literacy skills in good and poor comprehenders

Experimental studies,Educational technology,Self-regulation,Reading comprehension,Computer-assisted learning

Maria-Angeles Serrano, University of Valencia / Interdisciplinary Research Structure for Reading Research (ERI Lectura), Spain; Eduardo Vidal-Abarca, Universidad de Valencia, Spain; Ignacio Manez, ERI Lectura, University of Valencia, Spain; Amelia Mana, University of Valencia, Spain; Laura Gil Pelluch, University of Valencia, Spain; Ramiro Gilabert, Universidad de Valencia, Spain; Vicenta Avila, ERI Lectura, University of Valencia, Spain; Ana C. Llorens, University of Valencia, Spain;

Students often perform a wide variety of tasks using information available throughout the process. In these situations, students have to take a series of decisions in which the strategies of self-regulation play an important role and predict success in the task. Vidal-Abarca & colleagues have developed an intelligent tutoring system called TuinLECweb to teach and train self-regulation strategies related to reading literacy skills. It includes eight lessons distributed in two phases, learning and practice, and adopts ITS principles, as it provides immediate and adapted feedback, incorporates virtual agents to model and guide the students practice and uses a game-like environment that helps to maintain motivation. In this study we analyze the efficacy of an intervention with TuinLECweb to improve reading literacy performance and self-regulation strategies of 6th and 7th graders, and of a sample of good and poor comprehenders. We also analyze the reading motivation throughout the study. All the students performed a reading-literacy task before the intervention, after that, and two weeks afterwards. Results showed that TuinLECweb was effective short-term to improve performance and self-regulation in search decisions in reading-literacy tasks. Interestingly, improvement in performance was only maintained long-term by poor comprehenders. Results in reading motivation showed that good comprehenders scored marginally better than poor comprehenders before the intervention, but these differences disappear after that. We conclude that poor comprehenders benefit from TuinLECweb in a greater extent than good reader. Future research should focus on identifying the student profiles at which this intervention could be aimed.

I 16

27 August 2015 15:45 - 17:15

Room Brown_B6

Thematic Poster

Workplace learning

Workplace learning and financial literacy

Keywords: Content analysis,Qualitative methods,Reflective society,Literacy,Out-of-school learning,Lifelong learning,Vocational education,Mixed-method research,Social aspects of learning,Social interaction,Higher education,Workplace learning,Meta-analysis,Student

learning,Cognitive development,Social sciences,Comparative studies,In-service teacher education,Teacher professional development,Secondary education

Sig's: SIG 11 - Teaching and Teacher Education,SIG 14 - Learning and Professional Development,SIG 3 - Conceptual Change,SIG 4 - Higher Education

Chairperson: Eva Hornung, University of Sheffield , Ireland

Financial literacy of first-time home buyers - analysis of online information provided by banks

Content analysis,Qualitative methods,Reflective society,Literacy,Out-of-school learning,Lifelong learning

Mandy Hommel, University of Technology Dresden, Germany; Baerbel Fuerstenau, Dresden University of Technology, Germany; Claudia Leopold, Institute of Psychology in Education, Germany; Hector Ponce, University of Santiago, Chile; Mario Lopez, University of Santiago, Chile;

Raising a mortgage leads to long-term consequences for the individual financial situation. Thus, potential first-time home buyers need to know relevant concepts, procedures, and risks to take informed decisions. In order to prepare decisions, many people consult the internet. A rich source of information is offered on webpages of banks. Our study investigates whether information provided on the internet by banks can potentially support informative decision making and whether banks of industrialised and newly industrialised countries differ. For this purpose we analysed webpages of the biggest banks (by balance sheet total) in the USA, Germany and Chile by means of a content analysis. We compared similarities and differences between individual banks and between banks and a reference model (derived from the literature and validated by experts). The results show remarkable differences between banks and between countries. In addition, information provided by banks differs remarkably from information included in the reference model. Based on the results we can cautiously assume that information provided by banks may only partly be suited to support potential customers in informed decision making and thus in gaining financial literacy about mortgages.

Facets of financial literacy: Perspectives of stakeholders in European VET

Content analysis,Qualitative methods,Literacy,Vocational education

Carmela Aprea, Friedrich-Schiller-University Jena, Germany; Seraina Leumann Sow, Swiss Federal Institute for Vocational Education and Training, Switzerland; Eveline Wuttke, Goethe-Universitat Frankfurt, Germany; Fatima Syed, University of Birmingham, United Kingdom;

The promotion of financial literacy ought to be a core issue for Vocational Education and Training (VET) especially because apprentices at a young age start earning money through their respective apprenticeships and are required to manage their own money earlier than other young people do. This fact, in turn, presupposes the availability of an educationally sound framework

for the diagnosis and promotion of financial literacy in VET. This task is addressed by the EU LLP Leonardo Da Vinci project ìFLinÄVETî, which unified academics and VET providers from six European countries. To identify facets of financial literacy, in each country key actors in VET and the financial literacy debate were interviewed about their view of the construct. Whereas the theoretical background of the project is formed by an extended approach of financial literacy (i.e., including personal finance skills as well as understanding of relational and systemic financial issues and non-cognitive aspects of financial literacy), the analysis results point out that facets of personal finance were dominant in the responses across the six countries and the different stakeholder groups. Within the individual-cognitive facet especially the area ìplanning and managing financial mattersî with its various subcategories is prominently represented. Finally, the data also point to some differences between countries and stakeholder groups, even though these comparisons should be interpreted carefully due to the small sample. The findings form a basis for the development of a financial literacy framework in VET.

Team learning for innovation in higher education: A mixed methods study

Mixed-method research,Social aspects of learning,Social interaction,Higher education,Workplace learning

Rike Bron, University of Twente, Netherlands; Maaike Endedijk, University of Twente, Netherlands; Peter Sleegers, Twente University, Netherlands;

In Higher Education, many changes towards more student-centred and interdisciplinary education are designed and implemented. In order to design such educational innovations, teachers in higher education have to work together in teams. In this research we study these teacher collaboration processes from a perspective of team learning. Team learning consists of a compilation of processes that circularly generate change or improvement. The three basic team learning processes described in the literature are sharing, co-construction and constructive conflict. The nature of these processes differs in different contexts. Until now, quantitative studies have yielded ambiguous results concerning the distinction between team learning processes, and qualitative research about team learning is relatively scarce. In our study, we therefore aim to provide a comprehensive description of the nature of team learning in higher education, using a mixed method design. Our study takes place at a Dutch research university, that is implementing a change towards modular (15 ECTS) and project-based bachelor courses. Teacher teams are responsible for designing these modules. In a qualitative part of our study, we followed ten teacher teams during their module (re)design, and recorded their team meetings. In the quantitative part of the study we administered a questionnaire to 120 teacher teams. Preliminary analyses indicate that a different operationalization of the basic team learning processes is needed, in order to better describe team learning in teams of more than three persons. In our poster session we will present this new operationalization.

How do therapists learn to become therapists: A literature review

Meta-analysis,Student learning,Cognitive development,Social sciences,Higher education

Thomas Lindgren, Stockholm university, Sweden; Stephan Hau, Stockholm University, Sweden;

There is a relatively large body of literature on how psychotherapy education should be taught and learned. Less attention has been directed towards how therapists learn. The aim of the present literature review is to consider research published from 2000 until present concerning learning processes in psychotherapy and supervision. The main questions were: What is the scope and quality of available research and what is considered known and unknown concerning how therapists learn to become psychotherapists. Search and selection criteria were developed and tested for reliability. Subsequent searches were performed using the Proquest multi database platform. An analysis of findings generated so far suggests a continued lack of research on how psychotherapists learn their trade. Implications of this finding are further discussed.

Cultural and structural workplace conditions in two Dutch secondary schools:a comparative case study

Comparative studies,In-service teacher education,Teacher professional development,Secondary education,Workplace learning,Lifelong learning

Monika Louws, Leiden University, Netherlands; Jacobiene Meirink, Leiden University, Netherlands; Klaas van Veen, University of Groningen, Netherlands; Jan van Driel, Leiden University, Netherlands;

School factors such as teacher collaboration, resources for learning (i.e., time, budget, materials), policies for professional development and the school climate, have been found to affect the way teachers learn (Imants & van Veen, 2010; Smylie, 1995). It is not so much the objective conditions supporting or impeding professional development but the way teachers make sense of those organizational conditions that affect teacher learning. Therefore, teachersí perceptions of workplace conditions are considered to play a major role in how they see school-based opportunities for professional development, and, as a consequence, how teachers self-direct their learning. In our study, we focused on how teachersí perceptions of cultural and structural workplace conditions are related to their learning goals. We compared two Dutch secondary schools with a comparative case study design. Teachers from both schools were positive about the support from management, collaboration among colleagues, learning opportunities provided (i.e., time, facilities, resources), and freedom of choice for teachers to decide what they want to learn individually. What was perceived as negative was a lack of teacher participation in decision making (top-down), a lack of a clear vision in the school and transparency of policies and procedures. Regardless of how positive or negative teachers were, almost all teachers formulated learning goals for their classroom practice. Teachersí individual stories and experienced problems in practice seem more influential for their learning goals than how they perceived their learning environment.

I 17

27 August 2015 15:45 - 17:15

Room Brown_B5

Thematic Poster

Assessment methods and tools

Keywords: Psychometrics,Assessment methods and tools,Attitudes and beliefs,Social aspects of learning,Secondary education,Learning in context,Quantitative methods,Science education,Higher education,Lifelong learning,Educational policy,Conceptual change,Primary education,Conversation/ Discourse analysis,Mixed-method research,Second language acquisition,Language (Foreign and second),Qualitative methods,Communities of practice,Metacognition,Self-efficacy,Computer-assisted learning

Sig's: SIG 1 - Assessment and Evaluation,SIG 16 - Metacognition,SIG 4 - Higher Education

Chairperson: Jorik G. Arts, Fontys University of Applied Sciences, Netherlands

Adaptation of Teacher Power Use Scale to Younger Learners, Student Teachers, and Czech Conditions

Psychometrics,Assessment methods and tools,Attitudes and beliefs,Social aspects of learning,Secondary education,Learning in context

Katerina Vlckova, Masaryk University, Czech Republic; Katerina Lojdova, Masaryk University, Czech Republic;

In our study we test the most influential, traditional typology of power as a relational phenomenon from French and Raven (1960). It distinguishes teacher's power in relation to a (by students perceived) principle on which it is based on, i.e. coercive, reward, legitimate, referent, and expert power. Power is understood as an ability of a person or a group to influence opinions, values, and behaviour of others (McCroskey et al., 2006). Our validisation study focuses on younger learners (lower secondary students), Czech sociocultural conditions of power in the classes and on student teacher`s power. For this purpose we adapted Teacher Power Use Scale (Schrodt, Witt, & Turman, 2007) first for measuring teacher`s power, later for measuring student teacher`s power. The convenient sample for the first adaptation consisted of 2188 students from 117 lower secondary classes, for the second of 130 classes taught by student teachers on a long term practice. The data about Czech teachers` classes basically supported the theory with the difference that ìnegativeî power bases (legitimate and coercive) were perceived as one factor and were strongly correlated. The data about student teachers will be presented at the conference and compared with the results of Czech teachers and international findings.

ìThe other side of the moonî: Studentsí conceptions of assessment in higher education

Quantitative methods,Assessment methods and tools,Science education,Higher education,Lifelong learning

Serafina Pastore, University of Bari, Italy; Monica Pentassuglia, University of Verona, Italy;

Nowadays, higher education systems are being called to reconsider the aims of assessment if we want that students develop skills and competencies for their future personal and professional life. Pursuing such aims involves the active participation of students in the assessment process. According to current educational policies, higher education systems have begun to pay particular attention to learning outcomes achieved by students, reconsidering not only the assessment of learning, but also the instructional design and the organisation of graduate courses. Current studies, especially on an international level, are moving towards the revision of traditional modalities of testing, the individuation of alternative forms of assessment and above all, the analysis of representations and perceptions that teachers and students have about assessment. Starting from this assumption the present paper reports results of a survey aimed to investigate Italian university studentsí conceptions of assessment. The SCOA-VI (Students of Conceptions of Assessment Inventory) has been used. Although the context of this paper is the Italian system, we thought the paper has relevance to international debate on teaching, learning, and assessment practices in the higher education context.

School grades: practices, results and their significance

Quantitative methods,Assessment methods and tools,Educational policy,Conceptual change,Primary education,Secondary education

Anita Diaz Suarez, Pontificia Universidad Catolica de Chile, Chile; Miguel Nussbaum, Pontificia Universidad Catolica de Chile, Chile;

Using assessment as a true reflection of learning outcomes becomes particularly important when considering the significance of grades in providing students with opportunities and social mobility. This quantitative study analyzes grades awarded across twelve grade levels and looks at their behavior within schools and between them. Furthermore, the study also looks at the consistency between national learning standards and the grades awarded by schools. The analysis is based on universal data from the 2007 student population in Chile. The results demonstrate an alarming disparity in terms of the criteria used by different schools, as well as in different grade levels. However, they also reveal a certain level of consistency between achievement on national standardized tests and the grades awarded by schools.

A Research Design for Investigating Formative Assessment

Conversation/ Discourse analysis,Mixed-method research,Assessment methods and tools,Second language acquisition,Language (Foreign and second),Primary education

George Michaeloudes, University of Cyprus, Cyprus;

This presentation will demonstrate the research design used for the investigation of Formative Assessment (FA) in English lessons in Cypriot Primary Schools. FA is defined as a process of assessing learning, modifying teaching according to information gathered and promoting learning with the aim of improving learnersí competence (Black & Wiliam, 1998). According to the literature, FA is an effective teaching strategy which is used in different contexts around the world (Black & Wiliam, 1998; Brookhart et al., 2010; Ellery, 2008). However, in the Cypriot

context, research in FA in particular and assessment of English language learning in primary schools in general, is very limited (Pavlou & Ioannou-Georgiou, 2005; Tsagari & Pavlou, 2008). Therefore, this study aims to investigate whether English primary school teachersí practices in Cyprus follow FA principles. Furthermore, by using a grounded theory approach it aspires to develop a new framework, in order to thoroughly investigate the recorded processes and functions of FA in practice. For achieving this purpose, classroom observations, stimulated recalls and semi-structured interviews with teachers were conducted. Additionally, questionnaires were sent to all primary schools in Cyprus. All instruments were analysed both qualitatively and quantitatively. Finally, an in-depth analysis of this research design will clarify whether the research results can eventually provide answers to the research questions of this study.

Viewing assessment from a practice perspective: implications for quality

Qualitative methods,Assessment methods and tools,Higher education,Communities of practice

David Boud, University of Technology, Sydney, Australia; Phillip Dawson, Monash University, Australia;

Assessment quality has traditionally been viewed as a function of measurement quality, placing great importance on such features as reliability and validity. In this conceptual paper we propose a new perspective on assessment based on socio-material practice theory. Framing assessment as a practice may allow us to ask more fruitful questions of assessment, leading to a more holistic understanding of quality. We outline the key features of assessment seen as a practice, and identify three levels of assessment practices: macro-level practices concerned with course-level assessment planning; meso-level practices such as the design and planning of assessment activities within a course unit; and micro-level practices around a particular assessment event. Meso-level assessment practices are identified from an Australian interview study of 33 university teachersí assessment design processes. One practice, which crosses this set, is examined in depth with reference to key features of practice theory. This is followed by discussion to illuminate the potential value in adopting this perspective in assessment research in higher education. Implications for thinking about assessment quality are identified.

Self-assessment of academic competencies via a computer based tool in Luxembourg primary school

Quantitative methods,Metacognition,Self-efficacy,Primary education,Computer-assisted learning

Denise Villanyi, University of Luxembourg, Luxembourg; Antoine Fischbach, University of Luxembourg, Luxembourg; Philipp Sonnleitner, University of Luxembourg, Luxembourg; Christina Siry, The University of Luxembourg, Luxembourg; Romain Martin, University of Luxembourg, Luxembourg;

Formative assessment is essential to effective teaching, that is teaching that puts the individual learner first. Feedback and self-assessment are key elements in this formative assessment. The present study aims at investigating (a) whether student self-assessment represents an added value

to both standardized and teacher assessments, (b) whether this (potential) added value is also recognized and perceived useful by the practitioners in the field, and (c) whether this additional information, if shared with teachers, has an impact on future teacher assessments. At the heart of our project lies the development and validation of a computer based student self-assessment instrument (CBSAI) that allows 3rd and 4th graders (age 9 to 10) to assess their perceived competencies in Mathematics and German reading comprehension. The CBSAI will be validated by administrating the tool in Luxembourgís primary schools and by cross-checking studentsí self-assessments collected via CBSAI with standardized assessments (test results from the national school monitoring) and with teachersí assessments (assessments on report cards). The perceived usefulness of student self-assessment for teacher-feedback will be explored via the results of teacher-questionnaires. Through the use of structural equation models we will be able to study the influence of CBSAI variance parts and other student variables on teachersí assessments separately. Our poster will focus on (a) the general presentation of the study, (b) the demonstration of the computer based student self-assessment instrument, and (c) the first data collections and related data analyses and results.

I 18

27 August 2015 15:45 - 17:15

Room Orange_E1

Round Table

Cognitive development

Cognitive development

Keywords: Experimental studies,Neuroscience,Emotion and affect,Interdisciplinary,Quantitative methods,Educational technology,Reasoning,Professions and applied sciences,Higher education,Model-based reasoning,Qualitative methods,Cultural psychology,Cognitive development,Culture,Developmental processes,Informal learning

Sig's: SIG 16 - Metacognition,SIG 22 - Neuroscience and Education,SIG 6 - Instructional Design

Chairperson: Wiebke Friederike Evers, Ulm University, Germany

Affective neuroscience in education: Conceptualization and measurement of affective load

Experimental studies,Neuroscience,Emotion and affect,Interdisciplinary

Julien Mercier, University of Quebec in Montreal, Canada;

Recent educational theory reaffirms the centrality of affect in learning. Patten (2011, p. 88) even calls for a ìre-conceptualization of emotion in relation to intellectî in order to better inform pedagogy. To this end, the goal of this roundtable is to refine a conceptualization and

measurement strategies of affect in such a way that affective processes can be dynamically put in relation with characteristics of the learning tasks, learning outcomes and cognitive processes. By analogy with cognitive load, which concerns the human cognitive architecture in learning (Antonenko, Grabner, Pass, & van Gog, 2010), the view of affective load proposed in this paper concerns how the human ìaffective architectureî dynamically reacts to characteristics of learning tasks during performance. The proposed conceptualization involves academic emotions as aggregates of psychophysiological processes mediated by appraisal processes. In terms of measurement, solutions for concomitant self-report, behavioral (observational) and psychophysiological data collection methods are currently being tested in our lab as a response to the need for triangulation of objective and subjective process-oriented measurement of affective aspects of learning. In our experiments to date, data integration is successfully achieved. However, the analysis of psychophysiological data recorded over whole learning tasks remains a challenge because of a perceived lack of theory about how relatively generic psychophysiological responses transform into relatively specific academic emotions over a range of time scales. As cognitive load informs pedagogical design in terms of information processing, affective load could orient pedagogical design in terms of emotion processing.

Watching People Fail: Improving Diagnostic Competence by Peer Feedback on Erroneous Diagnoses

Quantitative methods,Educational technology,Reasoning,Professions and applied sciences,Higher education,Model-based reasoning

Christian Strobel, Ludwig-Maximilians-Universitat (LMU), Germany; Martin R. MRGFischer, Munich University Hospital, Germany; Nicole Heitzmann, University Munich & Clinics of University Munich, Germany; Ingo Kollar, University of Augsburg, Germany; Jan-Willem Strijbos, Ludwig-Maximilians-Universitat (LMU), Germany;

Fostering diagnostic competence and error detection skills are important for diagnostic accuracy and success in medicine. Yet, medical students have repeatedly been reported to face problems performing accurate diagnoses. Therefore, we designed a video-based intervention to increase diagnostic competence and error detection skills of medical students. The focus of the study was to investigate whether watching erroneous modeling examples and providing peer feedback to these examples can foster diagnostic competence and error detection skills in future physicians. Learners watched video-based modeling examples of peer students performing differential diagnoses of dyspnea. Using a 2x2-factorial design, we experimentally varied (a) whether students had to provide feedback to the peers on the video versus just watch the videos, and (b) whether the videos they watched represented erroneous versus correct modeling examples. So far, a pilot study with twelve participants was conducted and analyzed. Data-collection for the main study (N = 180) is ongoing (finalized in Jan. 2015). Preliminary results of the pilot show that erroneous video-based examples might foster error detection skills better than correct ones. A positive connection between provided peer feedback by students and parts of their diagnostic competence was also found. The findings enhance our understandings of the mechanisms behind providing peer feedback and how erroneous modeling examples can be utilized to teach diagnostic competence and error detection skills.

Examining epistemic thinking as function of culture: The use of culture specific dilemmas

Qualitative methods,Cultural psychology,Cognitive development,Culture,Developmental processes,Informal learning

Michael Weinstock, Ben-Gurion University of the Negev, Israel;

People think differently regarding the nature of knowledge and knowing. The study of epistemic thinking focuses on how people understand and coordinate the objective and subjective aspects of knowing and make sense of multiple and discrepant knowledge claims. Typically described in terms of normative development, cross-cultural studies show differences in epistemic development and characteristics of epistemic thinking. This study focuses on within-culture variations of epistemic thinking with the assumption that social change will produce changes in development. Arab society in Israel has undergone notable change over the last half century. Three generations of Muslim Arab women in a village in Israel (20 adolescents, their mothers, and maternal grandmothers) were interviewed regarding their sociodemographic environment and responded to six dilemmas invoking epistemic thinking. The adolescents were more subjectivist than their mothers and grandmothers. Sociodemographic characteristics representing greater exposure to diverse people and ideas accounted for these differences, with parentsí education playing the strongest role. In addition to the results, a possible contribution of this study is the use of culture-specific dilemmas that allow for culturally valid epistemic issues to be examined which, in turn, pose a challenge to constructs of epistemic thinking developed with western samples.

I 19

27 August 2015 15:45 - 17:15

Room Cyan_F1

Round Table

Self-regulation

Self-regulation

Keywords: Student learning,Teaching/instruction,Self-regulation,Science education,Secondary education,Mixed-method research,Pre-service teacher education,Emotion and cognition,Higher education,Motivation and emotion,Quantitative methods,Instructional design,Computer-assisted learning

Sig's: SIG 16 - Metacognition,SIG 6 - Instructional Design,SIG 8 - Motivation and Emotion

Chairperson: Henrik Bellhauser, TU Darmstadt, Germany

Does studentsí SRL-training in an authentic learning environment improve their performance?

Student learning,Teaching/instruction,Self-regulation,Science education,Secondary education

Ilya Lebeau, KU Leuven, Belgium; Carla Schramme, KU Leuven, Belgium; Sofie Baeten, KU Leuven, Belgium; Roger Azevedo, North Carolina State University, United States; Marion Crauwels, KU Leuven, Belgium;

To fully comprehend the natural science topics from an interdisciplinary perspective, students should be able to monitor and regulate their cognitive, affective, metacognitive and motivational (CAMM) processes during learning. Students who self-regulate their learning of natural sciences are able to adapt their learning process in different ways. By predicting on how well they comprehend the topics and the corresponding learning outcomes (judgment of learning, JOL), students become aware of which aspects of the natural science courses are not yet fully mastered. The purpose of this study was to examine the effect of a self-regulated learning (SRL) training programme intervention on judgment of learning and studentsí achievement levels with a focus on natural sciences in secondary education in Belgium (Flanders). We hypothesize that if students reflect on their performance, and apply a self-evaluation SRL-guide to identify their personalized SRL-skills, learning outcomes will improve. However, if students reflect on their performance, are trained in SRL and apply a self-evaluation SRL-guide to specifically select the SRL variables required for their personal situation, their scores will ameliorate more.

From situational interest to long term individual interest

Mixed-method research,Pre-service teacher education,Emotion and cognition,Science education,Higher education,Motivation and emotion

Jennifer Archer, The University of Newcastle, Australia;

The study explored three questions about the relationships among situational interest in science, individual interest in science, and self-efficacy to teach science. First, can situational interest be aroused during a science unit, and how does this occur? Second, can strategies designed to generate situational interest enhance long-term individual interest in science? Third, can self-efficacy for teaching science be enhanced by strategies designed to arouse situational interest? Participants were 313 primary teacher education students undertaking a science unit. Quantitative surveys measured studentsí individual interest in science and self-efficacy to teach science at three time points: start of semester, end of semester, and ten months after the semester. An open ended survey (about situational interest) was administered three times during the semester, a survey rating teaching activities for situational interest was administered at the end of the semester, and individual interviews with 24 students were conducted at the end of the semester. Reported individual interest in science and self-efficacy for science teaching increased substantially from pretest to immediate posttest. There was a small but significant drop in individual interest from immediate posttest to delayed posttest, while self-efficacy remained constant. The students reported high levels of situational interest throughout the unit. They

pointed to teaching strategies that aroused both situational interest and long term interest. These strategies also enhanced studentsí self-efficacy to teach science.

Fostering self-regulated learning skills with the help of an electronic tutoring system

Quantitative methods,Instructional design,Self-regulation,Computer-assisted learning

Michelle Nugteren, Open University, Netherlands; Halszka Maria Jarodzka, Open University, Netherlands; Liesbeth Kester, Utrecht University, Netherlands; Jeroen Van Merrienboer, Maastricht University, Netherlands;

This study investigates if and how an electronic tutor can foster self-regulated learning skills. Three different electronic tutors are compared: (1) An Algorithm Tutor that gives quantified feedback and advice (such as an exact performance score), (2) a Heuristics Tutor that gives qualitative feedback and advice (such as globally indicating the level of performance), and (3) a Control Tutor that does not provide feedback or advice at all. Participants practice eight biology tasks from a database of 75 tasks, which they choose themselves. The tasks vary in difficulty and given support. The tutorsí feedback and advice focuses on task performance and on task selection. It is expected that participants who study with an Algorithm Tutor or Heuristics Tutor will become better at self-regulated learning than students with a Control Tutor.

I 20

27 August 2015 15:45 - 17:15

Room Yellow_G3

Round Table

Teacher professional development

Teacher professional development and teacher attitudes

Keywords: Mixed-method research,Assessment methods and tools,Synergies between learning, teaching and research,Teacher professional development,Attitudes and beliefs,Meta-analysis,Arts ,Primary education,Secondary education,Pre-service teacher education,Developmental processes,Higher education,Motivation and emotion

Sig's: SIG 1 - Assessment and Evaluation,SIG 11 - Teaching and Teacher Education,SIG 14 - Learning and Professional Development

Chairperson: Hilda Borko, Stanford University, United States

An exploration of EFL teachersí attitudes towards peer assessment of writing

Mixed-method research,Assessment methods and tools,Synergies between learning, teaching and research,Teacher professional development,Attitudes and beliefs

Eleni Meletiadou, University of Cyprus, Cyprus;

Peer assessment (PA), as one of the main forms of alternative assessment, has gained much importance in educational learning and educational research (van Gennip et al., 2010). It has been found to increase teachersí awareness in scaffolding students to achieve learning goals (OECD, 2005). Despite advantages, few studies have examined teachersí attitudes towards using PA (Yu and Wu, 2013). Bearing this in mind, a questionnaire with eighty-three closed Likert-scale statements and seven open questions was used in the current study to investigate ten EFL teachersí attitudes towards using PA of writing. Teachers also took part in semi-structured interviews to further explore their experience with PA. The present study was conducted with the aim of showing the effectiveness of a well-developed school-based PA implementation design. Teachers took part in an intervention study which aimed to explore the effectiveness of using PA in their intermediate EFL writing classes for a whole school year. Quantitative and qualitative analyses of the results revealed that teachers have a positive perception of the impact of PA on their teaching practices and on studentsí learning. They tend to favour PA and regard it as a valuable learning aid. However, it was also found that teachers are unfamiliar with ways to involve students in the assessment process through PA since they receive no training in PA skills. In response to the need for more information, this study will contribute a teacherís voice which in so far has been absent (Topping, 2010).

Examining the Literature on Music Teacher PD with the ìFeatures of High-Quality PDî Framework

Meta-analysis,Teacher professional development,Arts ,Primary education,Secondary education

Alfredo Bautista Arellano, Nanyang Technological University , Singapore; Xenia Yau, Nanyang Technological University, Singapore; Joanne Wong, Nanyang Technological University, Singapore;

Research on Professional Development (PD) conducted with teachers from different subjects matters ñespecially Mathematics and Science Educationñ has identified a series of features that tend to make PD successful, leading not only to high levels of teacher satisfaction but also to positive impact on teachersí pedagogies and/or gains in studentsí learning. Schollars have referred to these features as ìfeatures of high-quality PDî. In Music Education, a considerable number of PD programs has been implemented over the past three decades. However, the design of many of these programs is not based óat least explicitlyó on the features of high-quality PD identified in prior research. The goal of this study is to systematically examine the literature on Music Education from the ìfeatures of high-quality PDî framework. We conducted a detailed review of the literature published in seven mainstream Music Education journals since the early 90ís until October 2014. We identified 24 articles reporting on programs for Primary and/or Secondary Music teachers. Based on our findings, we conclude that the field of PD in Music Education presents both strenghts and weaknesses. Music programs seem strong regarding structure and working dynamics, as most of them provided teachers with multiple opportunities

for exploration, reflection and discussion, as well as with contexts for collegial sharing and collaboration. However, Music PD programs seem limited in areas such as their responsiveness to teachersí motivations and needs, their lack of focus on student musical thinking, and the limited follow-up support given to teachers after program completion.

Exploring transitions in teacher training programs

Mixed-method research,Pre-service teacher education,Developmental processes,Higher education,Motivation and emotion

Ariel Sarid, Levinsky College of Education, Israel; Tami Reuveni, Levinsky College of Education, Israel; Michaella Kadury-slezak, Levinsky College of Education, Israel; Ayala Shasoua , Levinsky College of Education, Israel;

In light of important differences especially between the first and second year of study at Levinsky College of Educationís teacher training program, this study aims to examine whether and to what degree humanistic-constructivist principles ñ that are accentuated during the first year of study and are practiced mainly through single-pupil practicum processes - continue to persevere in studentsí perceptions with the transition from first to second year of study ñ during which trainees move on to teach primarily in small groups and concentrate on discipline-specific contents and teaching methods. The research, which is still under way, employs a mixed method model both centering on quantitative findings as well as in-depth interviews in a two stage design. As to the best of our knowledge no other noteworthy research has specifically targeted transitions within teacher training programs, we claim that examining transitions by itself constitutes innovation in the research of teacher training programs. We also believe this study (and consequent paper) has special merit not only to the educational research community but also to practitioners, teachers and teacher trainers that will take part at the EARLI conference.

I 21

27 August 2015 15:45 - 17:15

Room Brown_B7

Thematic Poster

Technology-enhanced learning

Technology-enhanced learning, technology integration and collaborative learning

Keywords: Experimental studies,Peer interaction,Technology,E-learning/ Online learning,Computer-supported collaborative learning,Mixed-method research,Student learning,Conceptual change,Science education,Informal learning,Inquiry learning,Educational policy,Attitudes and beliefs,Engineering,Primary education,Secondary education,Qualitative methods,Educational technology,Learning approaches,Design based research,Reasoning

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 20 - Computer Supported Inquiry Learning,SIG 7 - Learning and Instruction with Computers

Chairperson: Eleni Kyza, Cyprus University of Technology, Cyprus

Interactive Explanations in Collaborative Task Solving: Face Your Partner When You Have to Explain

Experimental studies,Peer interaction,Technology,E-learning/ Online learning,Computer-supported collaborative learning

Irene Skuballa, University of Tuebingen, Germany; Ingrid Gottschling, University of Tuebingen, Germany; Alexandra Haux, University of Tuebingen, Germany; Tina Lorenz, University of Tuebingen, Germany; Stephanie Ronge, University of Tuebingen, Germany; Friedrich W. Hesse, University of Tubingen, Germany;

Self-explanations are cognitive activities which require self-construction and can, thus, lead to deep understanding. The effectiveness of self-explanations rests on a large body of empirical research demonstrating its positive impact on comprehension processes. Against the backdrop of self-explanations, interactive explanations refer to explanations in situations where learning partners mutually incorporate each otherís explanation contributions to jointly create understanding (Chi, 2009). In contrast to the well-established positive effect of self-explanations, the effectiveness of interactive explanations remains unclear. We, therefore, investigated whether interactive explanations can foster task solving and comprehension in a collaborative learning situation. In addition, we examined in how far a direct face-to-face situation has an influence on the effect of interactive explanations. The experiment conformed to a factorial design with the factors prompts to interactively explain (learning environment with prompts versus without prompts) and seeing partner (seeing versus not seeing). So far, 32 dyads (N = 64) were randomly assigned to the four conditions. Preliminary results indicate an interaction according to which interactive explanations are effective when partners can see each other. In addition, we found some associations between satisfaction with the collaborative situation and learning outcomes which were particularly apparent in the group which interactively explained and communicated face-to-face. Data collection is still ongoing at the present moment.

AR Supports for Conceptually Challenging Science Content

Mixed-method research,Student learning,Conceptual change,Science education,Informal learning,Inquiry learning

Susan Yoon, University of Pennsylvania, United States; Emma Anderson, University of Pennsylvania, United States; Joyce Lin, Knowles Science Teaching Foundation, United States; Karen Elinich, The Franklin Institute Science Museum, United States;

Research on learning about science has revealed that students often hold robust misconceptions about a number of scientific ideas. Digital simulation and dynamic visualization tools have helped to ameliorate these learning challenges by providing scaffolding to understand various

aspects of the phenomenon. In this study we hypothesize that students acquire a more accurate understanding of the Bernoulliís Principle, a very challenging science concept, through interaction with an augmented reality (AR) device. We show that even given a short period for investigation in a science museum, students in the AR condition demonstrate significantly greater gains in knowledge over students in the non-AR condition. Through interview responses, we further show that the AR affords greater ability to visualize details and hidden information to help students learn the science.

Pre-University Computer Science Education in the United States: The Landscape for Action

Educational policy,Attitudes and beliefs,Engineering,Technology,Primary education,Secondary education

Hai Hong, Google, United States; Jennifer T. Wang, Google, United States; Jason Ravitz, Google, United States;

Todayís world is vastly different from that of 100 years ago. Yet, much of what we teach at the pre-university levels remains the same (Dewey, 1897). With the advancement of technology, our education systems should adapt to teach new skills necessary for modern jobs, particularly those related to Computer Science (CS). To understand how we should take action, we sought to research the landscape of the existing pre-university CS education, beginning in the United States. Over 1,600 students, 1,600 parents, 1,000 teachers, 1,000 principals, and 2,000 superintendents will be surveyed each year for three years. The goal of the study is to understand (1) perceptions of, attitudes toward, and awareness of CS; (2) interest in and desire for CS; (3) in- and out-of-school opportunities for CS; (4) participation in CS, and (5) obstacles to providing and accessing CS opportunities. Preliminary results from the first year of implementation indicate that most respondents do not have a clear understanding of Computer Science. Results also indicate that there are discrepancies in opportunities between those with different levels of socioeconomic status, and many educators also noted that some underserved students need to focus on more basic subjects and behavioral issues rather than CS. These early results indicate the need to clarify the significant role of CS for all and the need equalize access to CS educational opportunities. Our research findings will help us focus efforts in the decentralized national education system to provide best practices for global educational reform.

A distributed technology environment for supporting students to work as a scientific community

Qualitative methods,Educational technology,Learning approaches,Science education,Primary education,Inquiry learning

Jim Slotta, OISE, University of Toronto, Canada; Rebecca Cober, University of Toronto, Canada; Tom Moher, University of Illinois at Chicago, United States;

We engaged middle school students in a six-week field study of schoolyard wildlife, with ìcamera trapî photos at the center of student inquiry. Their goal was to identify animals in their

schoolyard, and to understand their behaviors and interactions. The objective of this paper is to examine studentsí use of photographic evidence to support their inquiry about animal behavior and biodiversity. 22 middle school students conducted a 6-week unit, placing their camera traps four times, successively retrieving photos, contributing summary notes and connecting their findings to the wider community of their peers. To support student inquiry, we developed an iPad application for note-taking called Common Knowledge, which was used by students to plan their investigations, report photographic data, and create scientific arguments using evidence from their cameras and peersí notes. Four different kinds of photographs resulted from camera traps, iPad cameras, internet browser, and an iPad app called Photomat. Our analysis focuses on the studentsí use of photos as data within their Common Knowledge notes. We first examined the photos from the different sources (e.g., camera trap, iPad, Web browser) and performed a thematic analysis to understand the kind of information they convey. We then analyzed the congruency of photos and notes to understand the extent to which photos empirically supported the notes in which they were included. Our findings show that students were able to effectively use photographs as a source of scientific evidence, when supported through a carefully structured inquiry sequence, note structure, and scaffold prompts.

Augmented reality and explanation building in formal and informal contexts

Design based research,Student learning,Reasoning,Science education,Informal learning,Inquiry learning

Eleni Kyza, Cyprus University of Technology, Cyprus; Yiannis Georgiou, Cyprus University of Technology, Cyprus;

The augmentation of reality (AR) can support studentsí engagement and can result to cognitive and affective gains; at the same time, it can also present learners with significant challenges. We report on a design-based research study of 11th grade studentsí explanation building in two learning contexts (field trip, classroom). During the first design iteration, nine student pairs used the AR learning environment we designed to investigate an environmental science problem at a local lake. In the second iteration, five pairs of students investigated the same environmental science problem in the field but were also given the time to review their data and develop their explanations in the classroom the next day. The data collection consisted of each pairís audiotaped discussions during the AR field-based investigation, which lasted 2 hours, photographic records of their evidence capturing in the field, any notes kept by the students, studentsí discussions during their explanation building process in the classroom, and each pairís final explanations in the form of videos or posters. Studentsí explanation building episodes were coded in four levels. Findings indicate that students remained at Levels 1 and 2 in the field; the pairs working across levels were able to solve the problem and connected claims, data and evidence. This study supports the finding that designing for learning across contexts can contribute to studentsí reflective learning. Even though the two learning contexts appear to have potential for working synergistically, future studies should investigate more groups of students and the type of scaffolding provided.

J 1

28 August 2015 08:45 - 10:15

Room Purple_H2

Invited SIG

Instructional design

"Explaining differences in learning in classrooms in terms of differences in learning made possible"

Keywords: Instructional design,Phenomenography,Student learning,Teaching/instruction

Sig's: SIG 9 - Phenomenography and Variation Theory

Chairperson: Angelika Kullberg, Goteborg University, Sweden

Organiser: Angelika Kullberg, Goteborg University, Sweden

Organiser: Elina Wright, Regent's Park College, University of Oxford, United Kingdom

Discussant: Yrjo Engestrom, University of Helsinki, Finland

The theme of EARLI 2015 conference emphasizes synergies between teaching, learning and research. Graham Nuthall argued for research relating classroom teaching to student learning to bridge the theory practice gap. Classroom research using phenomenography and/or variation theory often analyse, and attempts to make connections between, what is made possible to experience from teaching and what students learn. It is important to explore the scope and limitations of such approaches in relation to other analytical approaches with similar interests. The aim of this symposium is to discuss approaches that try to explain differences in learning in classrooms in terms of differences in teaching. This topic contributes to a discussion about the analytical approaches scopes and limits and the development of research about teaching and learning.

Broadening lenses ñ softening claims: Exploring links between learning and teaching development

Qualitative methods,Instructional design,Numeracy,Mathematics,Primary education

Hamsa Venkat, University of the Witwatersrand, South Africa;

The interest in this symposium is on delving into research from a number of traditions that has looked at making connections between teaching and learning in mathematics education. In this preamble, I note research approaches that have worked at different scales. Claims of very direct connections between teaching and learning emanate from mathematically localized smaller-scale, time-limited work, while claims at broader associational levels come from studies looking

at teaching quality in the context of differential extents of learning gains. In this presentation, I examine findings from a mid-level study that tracks backwards from broad findings of shifts between cohorts in the extent of sophistication of their work with early number into an exploratory study of changes in the way aspects of number teaching occurred for three Grade 2 teachers in one school. The purpose of this analysis is to develop understanding of the features of mathematics teaching identified as changing that can be associated at a more general level with shifts in learning.

'Drown or drowning.' What is the difference? Teaching and learning the progressive aspect

Case studies,Qualitative methods,Teaching/instruction,Language (Foreign and second)

Clare Lindstrom, University of Jonkoping, School of Education and Communication, Sweden; Ulla Birgitta Jonsson-Runesson, University of Jonkoping, Sweden;

The aim of this paper is to discuss some findings from a Learning Study carried out with 6th grade English language learners in Sweden. The focus of the discussion is how differences in teaching affected what was made possible for the students to learn, and how this was reflected in student learning outcomes after the lessons. In this Learning Study three secondary teachers and the researcher collaborated to plan, teach, evaluate and analyze a series of lessons with the variation theory of learning as the pedagogical principle. The specific subject content was the grammatical structure known as the progressive aspect which poses considerable difficulties for English language learners. During the first lesson the progressive aspect was presented solely in terms of the present tense. However, in subsequent lessons, it was simultaneously contrasted with the simple aspect and also separated from tense attributes giving students possibilities to generalise the essential features of the progressive. When this was done, post-lesson assessments indicate more favourable learning outcomes regarding the meaning of the progressive when compared to the first lesson. The findings suggest that (i) treating the progressive as a whole, (ii) using patterns of variation and (iii) carefully chosen examples may encourage deeper understanding. Implications are discussed and examples from the lessons are presented. Further research in the area is called for.

Variation theory and the empowerment of teachers and learners

In-service teacher education,Teacher professional development,Teaching/instruction,Self-regulation

Peter Davies, University of Birmingham, United Kingdom; John Kirkman, University of Birmingham, United Kingdom;

This paper explores relationships between Variation Theory, ëself-regulationí and empowerment. It offers a way of framing these relationships which (a) recognises different kinds of empowerment, (b) provides a coherent way of describing and evaluating relations between Variation Theory, self-regulation and empowerment for teachers and for learners; and (c) suggests some implications for policies towards teacher development and professional autonomy. The analysis draws on reviews of literature which combine an interest in Variation

Theory with any of ëempowermentí, ëself-regulationí or ëassessment for learningí. We consider how combining the insights of Variation Theory with these approaches to learning and teaching enhances practice and provides a promising direction for research. We also suggest that this combination offers a direction for re-framing teacher professionalism and autonomy as an antidote to the widespread trend towards defining teacher professionalism in terms of adherence of officially sanctioned practices and standards.

Is there cultural limitation in interpreting the space of learning?

Instructional design,Synergies between learning, teaching and research,Teaching/instruction,Culture,Mathematics

Ming Fai Pang, University of Hong Kong, China; Wing-wah KI, University of Hong Kong, Hong Kong;

Learning study places due emphasis on examining how the same content is dealt with by different participating teachers, in terms of what and how important aspects of the phenomenon concerned are brought to variation and remain invariant and its relation with learning outcome. The focus of analysis is on the space of learning. Previous studies have shown that it is a powerful way of developing a deeper understanding of teaching and learning. However, is there cultural limitation when the researcher(s) interprets the space of learning for a particular lesson? Should one see the space of learning as something subjective and cultural specific, or objective and universal, or parts of both? This paper draws upon the mathematics lessons taught by two Shanghai teachers, with the lesson analysis conducted by Shanghai educators using the framework of ìBianshi teachingî from China as well as by Hong Kong educators using ìVariation theory of learningî from Hong Kong and Sweden. It will report the personal and cultural similarity and differences in the ways that the educators concerned interpret the intention and enactment of variation and invariance in the mathematics teaching and its connection to the learning outcome. Furthermore, it will shed light on how the two theories of variation, with shared insights on a basic learning mechanism of variation and invariance, yet situated within two educational systems and cultures, will be actualised in analysing the lessons. It will explore what learning potentials for teachers can be afforded by having the dialogue between the two theories.

J 2

28 August 2015 08:45 - 10:15

Room Green_A7

Invited SIG

At-risk students

Effective Intervention in Special Education: Four approaches

Keywords: At-risk students,Early childhood education,Mathematics,Metacognition,Special education

Sig's: SIG 15 - Special Educational Needs

Chairperson: Eva van de Weijer-Bergsma, Utrecht University, Netherlands

Organiser: Evelyn Kroesbergen, University of Utrecht, Netherlands

Organiser: Christian Liesen, University of Applied Sciences of Special Needs Education, Switzerland

Discussant: Christian Liesen, University of Applied Sciences of Special Needs Education, Switzerland

At its core, Special Education follows a case-based methodology, both in research and intervention. What are effective accommodations for students with special needs? What interventions prove beneficial to the development and achievement of at-risk students? And which methods and procedures can be generalized to be effective for broader levels of the student population? "At-risk students" may serve as a common denominator for these research questions. In this invited symposium, four approaches to establishing effective interventions in Special Education will be under consideration. Each can be thought of as standing for a broader "school of thought" or scholarship in the field, explicitly focusing on instruction, accommodation, and/or prevention. All four approaches embrace notable innovative elements, be it in methodology, field of inquiry, or scope. As a consequence, the symposium will make a contribution to identify seminal work in today's, and tomorrow's, Special Education research.

Enhancing Quality of Math Instruction with Teacher Professional Development about Differentiation

Video analysis,In-service teacher education,Learning approaches,Mathematics,Primary education

Emilie Prast, Utrecht University, Netherlands; Evelyn Kroesbergen, University of Utrecht, Netherlands; Eva van de Weijer-Bergsma, Utrecht University, Netherlands; Johannes Van Luit, Utrecht University, Netherlands; Mare van Hooijdonk, University of Utrecht, Netherlands;

Teacher-level interventions are one potential way to enhance instructional quality and, in turn, student performance. A need for teacher professional development about differentiation (the adaptation of instruction to diverse educational needs) has been identified. 18 teachers participated in a professional development programme about differentiation in primary school mathematics, 17 teachers served as control group. Video-observations were obtained before and after the professional development programme and were coded with the Mathematical Quality of Instruction instrument (MQI; Learning Mathematics for Teaching Project, 2011). As hypothesized, Bayesian analysis of the observed growth in mathematical quality of instruction revealed that teachers who participated in the professional development programme were better

able to link and connect ideas or procedures, were better able to give mathematical meaning to ideas and procedures, more often presented and compared multiple procedures or solution methods for a problem at stake, and applied more remediation compared to the control group. Contrary to our expectations, teachers who participated in the professional development programme were not better able to respond properly to studentsí mathematical productions in instruction. This study revealed that it is possible to enhance mathematical instructional behavior of primary school teachers with a professional development programme about differentiation. Future research should establish whether this intervention at teacher level also promotes higher student achievement. During the presentation, we will share our most recent findings regarding achievement effects.

Incorporating Metacognition in Classroom Teaching: How to foster learning in all students

Experimental studies,Special education,Teaching/instruction,Metacognition

Marco Hessels, University of Geneva, Switzerland; Christine Hessels-Schlatter, University of Geneva, Switzerland;

Children can act on strategies consciously and make use of them efficiently when they know which strategies they have at their disposal, what their utility is, and when they should apply them; that is, efficient strategy use requires a certain degree of metacognitive knowledge. This means that metacognition plays an important role in learning (Bjorklund, 2005). By contrast, students with learning difficulties do not spontaneously generalize what they have learned to other contexts (Sugden, 1989) and limited strategy use and lack of transfer of strategies to novel situations typify important characteristics of their learning (Fuchs et al., 2003; Wong, 1994). We present findings from a series of intervention studies, conducted from 2009 onwards, on metacognitive teaching for students with and without special needs. Study implementations and results serve to illustrate the possible increase in metacognitive competencies in students and the subsequent positive influence on cognitive processes, the increase in strategic learning and potentially greater school success.

Interventions in Early Childhood Education

Experimental studies,Cognitive development,Developmental processes,Parental involvement in learning,Social aspects of learning,Early childhood education

Andrea Lanfranchi, University of Applied Sciences of Special Needs Education, Switzerland;

Educational careers are strongly influenced by early childhood experiences. The PISA studies demonstrated the close connection between social status and school success (OECD, 2010). Supporting children from at-risk backgrounds at the beginning of schooling may not be enough to compensate for disadvantages. Therefore, early childhood (0 to 3 years) is seen as an ideal age for intervention in order to alter long-term educational opportunities. Internationally, a growing body of programs focuses on the early support of children living in environments that may jeopardize their development (for reviews see Bull, McCormick, Swann & Mulvihill, 2004; Heckman & Masterov, 2006). Early intervention programs aim at increasing educational

opportunities by providing children with early support from birth onwards. Other than in formal education, the child is not the primary addressee of the support. Rather, the goal is to improve parenting behavior by increasing the awareness of child development, and the parentís attitudes and feelings towards the child. In this symposium we present the major RCT-study with high-risk-family-supporting programs in Europe: ìZEPPELIN 0-3î with the program ìPAT ñ Learning with Parentsî (Neuhauser, 2014). First results show that the intervention at age 1 and 2 has a positive impact on child development and parental competencies.

Accommodations for Students with ADHD in Higher Education

Assessment methods and tools,Special education,Learning and developmental difficulties,Higher education

Dieter Baeyens, KU Leuven, Belgium; Dorien Jansen, KU Leuven, Belgium; Katja Petry, KU Leuven, Belgium; Ilse Noens, KU Leuven, Belgium;

The phenomenology of ADHD changes across the lifespan but remains associated with impairment in various domains such as education (Schmitt & Petermann, 2008). Students with ADHD are more likely to repeat years and are less likely to graduate in higher education (Weyandt & DuPaul, 2008). Although reasonable accommodations potentially neutralize functional impairments, they fail to do so when they do not take into account age-specific manifestations of ADHD and the wide range of teaching and evaluation methods. Also, implementation parameters of accommodations are currently set on an intuitive basis (e.g., how much additional time is needed in ìextended examination durationî?). Therefore, we aim to extend current knowledge on the selection and implementation of accommodations in students with ADHD in higher education. Firstly, we examined which problems students with ADHD experience in a variety of teaching and evaluation methods through a systematic literature review and a survey study. A set of 16 problems was reported to be more prevalent in 86 students with ADHD compared to 250 controls. However, impairment fluctuated across teaching and evaluation methods. For most problems, a set of effective accommodations could be determined. Secondly, in an experimental design, we investigated optimal implementation parameters of ìextended examination durationî (+0%, +33%, +50%) in students with ADHD during a closed-book exam. Data collection in 35 students with ADHD and 35 typically developing controls is still ongoing. Findings will provide insight on the optimal ìdoseî at which functional impairment is neutralized, be it without giving (unfair) advantage to students with ADHD.

J 3

28 August 2015 08:45 - 10:15

Room Brown_B1

Invited SIG

Research methodology

Negotiating Knowledge and Emotions in On-line Interaction

Keywords: Communities of learners,Cooperative/collaborative learning,E-learning/ Online learning,Informal learning,Learning analytics,Social interaction

Sig's: SIG 10 - Social Interaction in Learning and Instruction

Chairperson: Asa Makitalo, University of Gothenburg, Sweden

Organiser: Oystein Gilje, University of Oslo, Norway

Organiser: Sten Ludvigsen, University of Oslo, Norway

Discussant: Maria Beatrice Ligorio, University of Bari, Italy

Learning and instruction through social interaction in an online learning environment is now a phenomenon that was unthinkable only a decade ago. To learn in online environments creates specific/new conditions for participation. Online environments often involve specific types of work with artefacts and communication with peers and teachers. In such interactions, learners are increasingly leaving traces of their learning activity across a wide range of learning environments as well as in social media. This invited symposium in SIG 10 is devoted to the study of learners' social interactions in a variety of different online environments where people solve specific tasks under certain conditions. Each of the four contributions reflects upon how to combine data sifting methods with data of social interaction in specific learning situations in classrooms. The aim of the symposium is to address the challenges in these online environments. Drawing on socio-cultural perspectives on learning, interactional sociolinguistics and the ethnography of communication, these contributions analyse four different online environments, two of which are designed for the purpose, while the latter two are generic social media sites used for educational purposes. By contextualising and connecting students' entry into online environments to other forms of observational data of social interaction, the researchers explore episodes and events that consist of meaningful and thematically unified chat interactions. The discussant will address the communalities and differences between the approaches in the four presentations.

Emotions in motion in virtual creative collaborative writing

Case studies,Educational technology,Emotion and affect,Writing/Literacy,Primary education,Communities of learners

Kristiina Kumpulainen, University of Helsinki, Finland; Antti Rajala, University of Helsinki, Finland; Sinikka Kaartinen, University of Jyvaskyla, Finland; Anna Mikkola, University of Helsinki, Finland;

Drawing on a sociocultural perspective, this study examines the ways in which emotions are negotiated and mediate studentsí virtual collaborative writing processes while engaged in a joint creative activity on a school musical script. In this study, we view cognition, emotions and

creativity as interrelated aspects of social practice and as closely linked to meaning-making. The empirical data of this study derive from fifth- and sixth-grade (ages 11 to 12) students who worked with personal laptops, wireless Internet access and a collaborative writing service, VisciPad, at school and outside of it to collaboratively create a school musical script. Our analyses focus on the chat interactions of 10 student teams (N = 21; 4,744 messages). The methodological framing of this study is based on interactional sociolinguistics and the ethnography of communication. The studentsí joint creative writing processes were found to be supported by a rich repertoire of modes of meaning-making, reflecting the significance of emotions in creative collaborative writing. The rich discursive practices revealed by our analysis also highlight the demands and complexity of virtual creative collaborative writing. The findings have implications for educational research and practice; they challenge current conceptualisations of educationally productive interactions. During creative engagement and learning, social interaction may sound and look like play: unbounded, free-flowing and unpredictable. Transforming educational practices to accommodate such playful interactions calls for reconceptualising productive talk in creative learning activities.

Conceptual change in natural science: How can learning analytics be used?

Design based research,Conceptual change,Biology ,Social sciences,Secondary education,Computer-supported collaborative learning

Sten Ludvigsen, University of Oslo, Norway;

Analysing log data in combination with other methods can help us to understand student learning in new ways. Students often use both on-line environments and collaborate with peers in the classroom; this means that in on-line environments, specific patterns of participation can be analysed using different tools. A number of tools called learning analytics (LA), e.g. log data, can give valuable information. However, learning is a definite phenomenon and we need specific types of data to explain how and what students learn. To describe only structural features or performance data on individuals offers an overly narrow view of student learning. To understand students learning via LA, we need to have a high number of points of registrations regarding their actions, and we should combine quantitative techniques with qualitative methods. We define learning as being constituted of social and cognitive processes; these processes are intertwined.

Learnersí framing of language-learning activities on social media

Ethnography,Cultural psychology,Peer interaction,Language (Foreign and second),Secondary education,Cooperative/collaborative learning

Annika Lantz-Andersson, University of Gothenburg, Sweden; Sylvi Vigmo, University of Gothenburg, Sweden;

This presentation focuses on three exploratory studies of learnersí social media interactions: two English as a second language (ESL) Facebook groups and one Blogger group. The aim of the study was to gain insights regarding the implications of utilising social media as part of specific

linguistic activities of language-learning practices, comprising the practice of mundane communication. The studentsí linguistic interactions in the Facebook groups and in the Blogger group have been logged and scrutinised; the introductory Blogger class was video-documented. The analysis of the empirical material focused on the interaction between the students to explore how the students framed the activities in relation to what they considered to be appropriate literate practices, and by that, what linguistic genre they used and how they responded to each otherís utterances in and through the moment-by-moment interactions. The findings indicate that the social media context offered a casual and encouraging space to communicate where the students could employ English and make use of their out-of-school digital vernacular habits. The learners demonstrated their diverse uses of available linguistic and social resources to negotiate the linguistic, interactional and cultural demands of online discourses.

Negotiating learning lives through Facebook groups in lower secondary school

Ethnography,Cultural psychology,Peer interaction,Out-of-school learning,Secondary education,Communities of learners

Oystein Gilje, University of Oslo, Norway;

In line with the overall theme of this symposium, this study investigates social interactions in online environments by scrutinising social interaction among students and their teachers (N = 62) in two lower secondary classes over three years. The aim of the study is to understand how the pupils and their teachers organise classroom-related learning activities in two closed Facebook groups, one for each class. The study has a socio-cultural approach to written language and sees literacy as a social practice in online environments. The analysis is two-fold. First, based upon an analysis of the different patterns of social interaction over three years, three types of social interaction are identified. Second, one particular project, a full day of filmmaking in an English class, is followed by analysing data from the closed Facebook group that five female students made for this day together with observational data of the work with the film. The findings in the first part of the study unravel three different forms of social interaction on Facebook related to schooling. The second part of the study illustrates how studentsí collaboration on Facebook relates to the their social interaction in filmmaking.

J 4

28 August 2015 08:45 - 10:15

Room Brown_B2

Invited EARLI

Learning approaches

EARLI meets LS: The impact of Learning Sciences research on real-world learning

Keywords: Computer-supported collaborative learning,Design based research,Learning approaches

Sig's: SIG 10 - Social Interaction in Learning and Instruction

Chairperson: Eleni Kyza, Cyprus University of Technology, Cyprus

Organiser: Eleni Kyza, Cyprus University of Technology, Cyprus

Organiser: Carolyn Rose, Carnegie Mellon University, United States

Organiser: Cindy Hmelo-Silver, Indiana University, United States

Discussant: Frank Fischer, Ludwig-Maximilians-Universitat (LMU), Germany

In the last decades, the research community has amassed a great deal of knowledge on how people learn in different contexts and how one can facilitate this learning. The Learning Sciences community engages in research with a dual goal in mind: develop theory on how people learn in different settings and have impact on real-world learning. This symposium examines the impact of learning sciences research in four contexts, encompassing in and out of school settings, students and teachers, collaborative learning, and design studies. Each of the presentations in this symposium addresses one important aspect where learning sciences research has had real impact (the classroom, computer-supported collaborative learning, design of learning environments, and informal learning), drawing from theory and empirical studies. Iris Tabak's (Ben Gurion University of the Negev, Israel) presentation focuses on synergistic scaffolding to support classroom learning; Cindy Hmelo-Silver (Indiana University, USA) will discuss research around productive computer-supported collaborative learning (CSCL) experiences; Jim Slotta, Cresencia Fong and Rebecca Cober (University of Toronto, Canada) will discuss a series of design studies, involving innovative technologies; finally, Catherine Eberbach (National Science Foundation, USA) will present learning sciences research on learning in informal settings. The session will conclude with a discussion of the key issues recognized in each of the presentations and the implications of LS research on real-world practices by Frank Fischer, a long time member of both the EARLI and the ISLS communities.

Synergistic Scaffolding: How a Design Focus Advances and Constrains the Study of Classroom Learning

Design based research,Synergies between learning, teaching and research,Teaching/instruction,Learning in context

Iris Tabak, Ben-Gurion University of the Negev, Israel;

A focus on design and the adoption of both cognitive and sociocultural approaches characterize much research in the learning sciences. Questions about learning are broached with an orientation toward developing solutions to problems, or through creating circumstances that enable desirable or envisioned forms of activity. The study of classroom learning, specifically,

centers on designing artifacts and understanding their use in context. I posit that this theoretical orientation and these research practices created a fertile ground for a reconceptualization of scaffolding as distributed and embedded in artifacts. In this presentation, I focus on a specific type of distributed scaffolding, synergistic scaffolding, where different scaffolds work in concert to support the same learning need. I draw on a number of studies around synergistic scaffolding to illustrate some insights on classroom learning that arise from this body of work. I further examine how a distributed approach can advance a multi-dimensional and contextual approach to learning, while at the same time, the saliency of material and technological scaffolds can lead to a static and narrow perspective. In this vein, I conclude with a discussion of the affordances and constraints of a design focus in research on classroom learning.

Computer-supported Collaborative Learning and the Learning Sciences: Synergies and Challenges

Educational technology,Instructional design,Computer-supported collaborative learning,Cooperative/collaborative learning

Cindy Hmelo-Silver, Indiana University, United States;

This presentation will focus on the positioning of computer-supported collaborative learning (CSCL) within the learning sciences more broadly. CSCL is an interdisciplinary research field, which constitutes one major branch of the learning sciences and which features educational technology research. Specifically, it is concerned with studying how people can learn together with the help of computers (Stahl, Koschmann, & Suthers, 2006). An approach to CSCL that focuses on affordances that lie at the intersection of technology and pedagogy will be described. Specifically, a focus on affordances brings together theories of collaborative learning from the learning sciences with the technologies and practices of CSCL. For the learning sciences, guiding questions tend to focus around pedagogy and learner activity, drawing from cognitive, constructivist, and socio-cultural theories that inform design of support for collaboration. In CSCL, the technological dimension is added to the mix as a more prominent focus to support learners in engaging in productive collaboration. What defines productive collaboration can be quite variable within the CSCL and other learning sciences communities. These differences and challenges will be discussed along with some examples of CSCL in practice.

Teacher-led discourse in inquiry classrooms: A role for aggregate displays of studentsí knowledge

Conversation/ Discourse analysis,Design based research,Communities of learners,Computer-supported collaborative learning,Inquiry learning

Jim Slotta, OISE, University of Toronto, Canada; Cresencia Fong, OISE, University of Toronto, Canada; Rebecca Cober, OISE, University of Toronto, Canada;

In inquiry classrooms, the teacherís role is a complex blend of lecture, pedagogical orchestration, small group interactions, formative assessment, spontaneous and planned whole class discussions. Teachers who are veterans of an inquiry-oriented approach often develop some

mastery of discourse patterns, where selected students or the whole class is asked a question, and student responses are re-voiced in such a way that it offers new direction to student inquiry. As learning scientists, we are introducing new models of collaborative and collective inquiry into a technology-enhanced environment, challenging teachers ñ even those who are masters of inquiry discourse ñ to accommodate new forms of student activity and interactions. This paper will present a sequence of design-oriented studies that investigate innovative forms of visual representation in the classroom, and how those visualizations influence teacher-led discourse. In one activity, students add brainstorm and inquiry proposal notes to a classroom knowledge base, presented on a Smart board the front of the classroom. The teacher must help students synthesize and interpret those comments, offering summative statements and guiding questions so that students can progress with their inquiry (Fong et al, 2013). For such studies, the design of the technology environment is an intrinsic aspect of the research methodology, and is seen as part of a discourse activity system. The presentation will focus on analysis of design and enactment, including discourse patterns, such as when teachers intercede with the class, how they make use of the visual representations, and their impact on studentsí subsequent activities.

Facilitating Disciplinary Practice at the Intersection of Learning Sciences and Informal Learning

Conversation/ Discourse analysis,Parental involvement in learning,Science education,Informal learning

Catherine Eberbach, National Science Foundation, United States;

How do children begin to make the transition from seeing the natural world to scientifically observing the natural world? This study considers how differences in parent conversational strategies and disciplinary knowledge impact childrenís experience observing biological phenomena during shared informal learning. 79 parent-child pairs participated in a study in which half of the parents used their natural conversational style and the other half were trained to use four conversational strategies during family observations of pollination in a botanical garden. Parents were also assigned to high and low knowledge groups according to their knowledge of pollination biology. Findings suggest that parents who received training used the conversational strategies more than parents who used their natural conversational style. Parents and children who knew more about pollination at the start of the study exhibited higher levels of disciplinary talk in the garden. However, the use of the conversational strategies also increased the amount of disciplinary talk in the garden. The extent to which families engaged in disciplinary talk in the garden predicted significant variance in what children learned. Implications for facilitating disciplinary practice at the intersection of the learning sciences and informal learning are discussed.

J 5

28 August 2015 08:45 - 10:15

Room Green_A1

Symposium

Mathematics education

Study prerequisites and learning activities in the transition to mathematics university study

Keywords: Educational attainment,Emotion and cognition,Higher education,Mathematics,Quantitative methods

Sig's: SIG 4 - Higher Education

Chairperson: Stefan Ufer, Ludwig-Maximilians-Universitat (LMU), Germany

Organiser: Matthew Inglis, Loughborough University, United Kingdom

Organiser: Stefan Ufer, Ludwig-Maximilians-Universitat (LMU), Germany

Discussant: Athanasios Gagatsis, University of Cyprus, Cyprus

Drop-out rates show that the entry into a university programme focusing on mathematics is challenging for beginning students. Firstly, the subject itself changes from a school subject with a focus on application to a scientific discipline that builds up a coherent theory of abstract definitions, theorems and formal proofs. Secondly, the transition poses subject-specific demands to activate effective learning strategies and behaviours. Current research mostly focuses on the entry phase into university from a very general perspective. The aim of this symposium is to gather empirical studies that contribute to a deeper understanding of subject-specific individual study prerequisites and learning processes specifically for the entry into mathematics university programmes. Matthew Inglis et al. (University of Loughborrough, UK) focus on learning from mathematical texts and report an eye-tracking study on students' strategies when reading mathematical texts. Stefanie Rach and Aiso Heinze (Leibniz-Institute for Science and Mathematics Education, Kiel, Germany) analysed the development and interaction of mathematics-related affective and cognitive learner characteristics during the transition to a mathematics programme. Ufer et al. (University of Munich, Germany) analyze the relation between students' cognitive study prerequisites, their mathematics-related study motives and learning activities and their study success during a first semester mathematics course. Winberg et al. (Ume? University, Sweden) contributes a study that explored the role of students' prerequisites and their study habits on their success during the first year of a university mathematics programme. Finally, Athanasios Gagatsis (University of Cyprus) will discuss the scientific and educational relevance and implications of the four studies.

High- and low-achieving mathematics undergraduatesí reading strategies: An eye-movement study

Quantitative methods,Comprehension of text and graphics,Mathematics,Higher education,Problem-based learning

Matthew Inglis, Loughborough University, United Kingdom; Lara Alcock, Loughborough University, United Kingdom; Christian Greiffenhagen, Loughborough University, United Kingdom;

Learning by reading text is central to the study of advanced mathematics. Indeed, some philosophers have argued that professional mathematicians learn the majority of their new mathematics by reading the proofs of others. However, many educational research studies have shown that students find it difficult to engage with mathematical text. Here we report a study in which high- and low-achieving undergraduate students were asked to read a passage from a textbook, and then take a comprehension test. Participantsí eye-movements were recorded as they read. We analysed the aspects of the text to which the two groups preferentially attended. Our findings suggest that an important difference between the reading behaviour of high- and low-achieving undergraduates concerns the extent to which they focus their attention on novel mathematical definitions and worked examples.

Do Interest and Self-concept Matter? Study Success in a First Semester Mathematics Course

Quantitative methods,Educational attainment,Emotion and cognition,Mathematics,Higher education

Stefanie Rach, IPN Kiel, Germany; Aiso Heinze, Leibniz Institute for Science and Mathematics Education (IPN), Germany;

Mathematics courses turn out to be a substantial obstacle for many university students in their first semester. Research studies at the university level often do not focus the specific situation during the transition from school to university and, in particularly, do not take into account the characteristic differences between subjects at school and as a scientific discipline. In a study with 182 students of a first semester mathematics course, we analyzed (1) how subject-specific affective learning prerequisites are influenced by the change of the subject mathematics from a school subject to a scientific subject and (2) how cognitive and affective learning prerequisites influence study success in the first semester. Our findings revealed a strong decrease of interest in mathematics and mathematics related self-concept in the first weeks at university. Interest and self-concept at the beginning of the first semester course did not have a significant impact on study success, whereas specific prior mathematical knowledge was highly predictive. It seems that studentsí interest and self-concept developed during mathematics education in school do not have a supportive value for the learning of scientific mathematics in a first semester course. The results support the assumption on different demands of mathematics as school subject and mathematics as scientific discipline at university. Educational implications for supporting students during the transition from school to university are discussed.

Determinants of university studentsí learning success in the transition to university mathematics

Quantitative methods,Educational attainment,Self-regulation,Mathematics,Higher education

Stefan Ufer, Ludwig-Maximilians-Universitat (LMU), Germany; Daniel Sommerhoff, University of Munich, Germany; Sarah Ottinger, University of Munich, Germany; Daniel Bembe, University of Munich, Germany;

Entering a university mathematics programme poses high and subject-specific demands on studentsí learning prerequisites and study behaviour already in the first weeks of study. Accordingly, high drop-out rates are reported from these study programmes. Research studies on learning processes at the university usually do not address these subject-specific demands. Even though past research has pronounced the importance of study motives and learning strategies in general, corresponding results are partially inconsistent. One hypothesized reason for this is that usually very general indicators are used to measure motives and learning behaviour. We present results from a study with N=349 first semester mathematics students that used specifically designed instruments to measure mathematics-related study motives and learning behaviour. We analysed (1) how studentsí learning activies and their general reported learning strategies relate to their prior knowledge and study motives and (2) how these prerequisites and studentsí learning activities impact study success in the first semester. Results indicate the importance of constructive learning activities and the role of study motives in activating these constructive activities. Unexpectedly, interactive learning activities showed no significant relation to student learning.

Success-factors in Transition to University Mathematics for stronger and weaker secondary students

Quantitative methods,Educational attainment,Mathematics,Higher education

Hans Thunberg, Royal Institute of Technology, Sweden; Samuel Bengmark, Chalmers University of Technology, Sweden; Mikael Winberg, Umea University, Sweden;

The study examined the relative importance of studentsí grades from upper secondary school, and student characteristics (self-efficacy, motivation type, study habits and view on mathematics) for predicting achievement of first-year university students in mathematics intensive programs. Furthermore, the predictive importance of these variables at the beginning and at the end of the first year were investigated. Principal Component Analysis (PCA) and Orthogonal Projection to Least Squares (OPLS) analysis were used for the identification of constructs and analysis of the predictive power of the constructs, respectively. Together, all the variables measured at the beginning of the year predicted 21% of the variation in students grades on the university courses, while measured at the end of the course they predicted 43%. If grades from upper secondary school were removed from the models, 14% respectively 37% could be predicted. Self-efficacy, motivation type, and study habits (in this order) pertaining to their university studies were better predictors than those pertaining to upper secondary school. Some differences in predictive patterns were found, depending on the level of the studentsí mathematical knowledge when entering their university studies. Study habits were shown to be more important for predicting achievement for the third of the studentsí with the lowest upper secondary grades than for the other groups. Relying on the textbook and frequent interaction with peers during the university studies predicted 12% of achievement for this group, whereas

these aspects were not predictive at all for the groups with intermediate and high grades from upper secondary school.

J 6

28 August 2015 08:45 - 10:15

Room Yellow_G3

Symposium

Assessment methods and tools

Group Differences in Large-Scale-Assessments: International Perspectives on Current Challenges

Keywords: Achievement,Competencies,Psychometrics,Quantitative methods

Sig's: SIG 1 - Assessment and Evaluation

Chairperson: Franziska Schwabe, TU Dortmund University, Germany

Organiser: Franziska Schwabe, TU Dortmund University, Germany

Discussant: Dominique Lafontaine, Universite de Liege, Belgium

To date we observe increasing diversity among students in social, cultural and other dimensions. Diversity challenges educational systems and raises high needs for measuring student's abilities in order to monitor school achievement. Among other methods to understand the challenges of diversity, large-scale assessments (LSAs) provide data on levels and trends in different domains of achievement. Taking a closer look at the observed differences in achievement and identifying sources of group differences is one of the challenging issues confronting educational research today. The main focus of the symposium is current international quantitative research on differences in achievement between subgroups of test takers considering different domains and age groups in LSAs. In particular, we focus attention on group differences in reading, mathematics, and science on the school level among elementary students--school composition effects (talk I), and gender-related differences in reading achievement at grade 4 (talk II). Next, we illustrate group differences in problem solving among 15-year-old students using process data (talk III) and present the challenges to validity specific to group differences in admissions testing at the high-school level (talk IV). Our set of psychometric approaches demonstrates the complex spectrum of issues related to LSAs in studying diversity and achievement. The findings of all four presentations have important implications for measurement taking into account the importance of assessment on the individual as well as on the system level. Ultimately, this symposium provides a multifaceted perspective on group differences, which, in the long run, is an important prerequisite for interventions and training.

Examining the elementary gender gap in reading: Effects of item format and language group

Quantitative methods,Assessment methods and tools,Literacy,Reading comprehension,Primary education

Franziska Schwabe, TU Dortmund University, Germany; Matthias Trendtel, Federal Institute of Education Research, Innovation and Development of the Austrian School System (BIFIE), Austria;

The gender gap in reading is a crucial issue because of the value of reading skills for both individual and societal success. International large scale assessments consistently pointed to considerable mean differences between boys and girls. Moreover, a specific advantage of girls in responding to constructed-response items was found, but findings differed depending on the country, age of students, and year investigated. This study aims at an exploratory inter-national comparison of intra-national elementary gender-related differences in responding to reading test items examining the effect of European language groups and considering trends over time. Differential item functioning was used to analyze interactions between gender and item format in nine European countries which participated in PIRLS 2011, 2006, and 2001. In line with prior research, results showed a significant main effect of gender and interactions between gender and item format with girls outperforming boys in general, and especially in constructed-response items in almost all countries and years. Nevertheless, a differentiated look revealed heterogeneous patterns. Contradictory to the theoretically derived assumptions, gender differences could not solely be traced back on differences between European language groups spoken. Therefore, alternative explanations of girlsí specific strength (a) girlsí higher levels of productive language skills and (b) their higher levels of motivation are presented taking into account the international setting. Moreover, results are discussed in relation to the design and interpretation of (large-scale) assessments, the increasing use of constructed-response items in new assessments in response to the Common Core State Standards, and gender-sensitive educational practice.

Explaining school composition effects through measurement invariance and predictive bias

Psychometrics,Quantitative methods,Assessment methods and tools,School effectiveness,Interdisciplinary

Daniel Kasper, TU Dortmund, Germany; Heike Wendt, Institute for School Development Research, TU Dortmund University, Germany; Daniel Scott Smith, Institute for School Development Research, TU Dortmund University, Germany; Matthias Trendtel, Federal Institute of Education Research, Innovation and Development of the Austrian School System (BIFIE), Austria;

In 2011 the International Association for the Evaluation of Educational Achievement (IEA) accomplished a joint administration of the Progress in International Reading Literacy Study (PIRLS) and Trends in International Mathematics and Science Study (TIMSS) (Martin & Mullis, 2013). More than 30 countries participated with representative samples of grade 4 learners in the

assessment of reading literacy, mathematics and science. This endeavor provided a unique dataset to investigate educational phenomena across or in relation to different achievement domains. Martin, Foy, Mullis and O'Dwyer (2013) use the combined data set and analyze the relationship between school composition (as a measure of group differences between classes) and student achievement for all participating countries. It turns out that the school composition effect varies highly over the countries. For Germany, the regression coefficient measuring the effect of class differences in composition on achievement was substantively large. Due to this, we re-analyze the data set by (a) varying the indicators constructing the school composition index and (b) varying the degree of assumed measurement invariance for the school composition index over the countries. By this we can show that the estimated effect of group differences depends partly on the used indicators for scaling the composition index as well as on the degree of assumed measurement bias. Explanation of these results through mathematical formulation expanding the work of Millsap (1997) and implications for scaling procedures constructing background indices for estimating group differences in international comparison studies is discussed.

Exploiting process data: The link of studentsí behavior to performance in PISA 2012 problem solving

Psychometrics,Quantitative methods,Assessment methods and tools,Achievement,Competencies,Problem solving

Sascha Wustenberg, University of Luxemburg, Luxembourg; Jonas Neubert, University of Luxembourg, Luxembourg; Katinka Hardt, University of Luxembourg, Luxembourg; Julia Rudolph, University of Luxembourg, Luxembourg; Samuel Greiff, University of Luxembourg, Luxembourg;

In recent years, large-scale assessments increasingly implement computer-based testing (e.g., problem solving in PISA 2012). Studentsí behavior is thereby stored in logfiles, highlighting the studentís route towards specific performance outcomes. Unfortunately, there is a lack of systematic approaches to investigate these process data. We use the PISA 2012 problem solving task Climate Control and analyze the process data of N=15,864 students from 43 countries, including 477,114 behavioral actions. In our approach (1) we utilize process data to identify 60 features (e.g., time-on-task; control of variables strategy, CVS), that is, meaningful pieces of behavioral actions. Using time-on-task and CVS as examples, we examine empirically if features vary across students in different countries. Further, (2) we investigate if the features are linked to problem solving performance, and (3) we explore if the features can be used to differentiate between subgroups of unsuccessful students. Results revealed that (1) time-on-task and CVS varied considerably across countries and that (2) CVS but not time-on-task was linked to the final performance outcome. Finally, (3) based on the feature CVS, we distinguished subgroups of unsuccessful students who did not apply CVS at all, who did not apply CVS consistently, or who applied CVS without solving the task. Thus, we were able to distinguish between unsuccessful problem solvers by utilizing process data, which may be used for tailored interventions in the long run. Implications and further steps such as the extension to other problem solving tasks are discussed.

Investigating group differences and validity challenges in admissions testing

Psychometrics,Quantitative methods,Assessment methods and tools,Competencies,Higher education

Christina Wikstrom, Umea University, Sweden; Magnus Wikstrom, Umea universitet, Sweden;

The SweSAT is a test used for selection to higher education in Sweden. Its main purpose is to predict academic performance, but it is also expected to contribute to a broadened recruitment to higher education, by giving students ìa second chanceî to compete for attractive study positions. Since the introduction of the test in 1977 a concern has been the observed group differences in performance. When trying to adjust for this in various ways, the test has been criticized for lacking in predictive validity. Hence, the most recent revision had the purpose to improve the predictive strength. Items have been revised, and new subtests have been introduced. Two separately scaled and normed sections, one verbal and one quantitative, have been created. The idea is make it possible to use the new score information when deciding on a selection model relevant for specific university programs. A validation of the revised test is now carried out and although the psychometric properties seem acceptable, and predictive strength is more promising, group differences have remained or increased. Further, speededness is an issue, and affects certain groups of test takers in a negative way. The findings are in line with research on similar instruments internationally. Implications for test interpretation and use, and also consequences for students, higher education and society, will be discussed.

J 7

28 August 2015 08:45 - 10:15

Room Blue2_D1

Symposium

Mathematics education

Searching for the roots of ratio and proportion

Keywords: Cognitive development,Mathematics,Numeracy,Primary education,Quantitative methods,Student learning

Sig's: SIG 3 - Conceptual Change

Chairperson: Wim Van Dooren, KU Leuven, Belgium

Organiser: Wim Van Dooren, KU Leuven, Belgium

Discussant: Xenia Vamvakoussi, University of Ioannina, Greece

Learning to understand the concepts of ratio and proportion is an important goal in upper primary and lower secondary education. Given their pivotal educational importance, their development has been extensively studied. One major finding is that younger children erroneously give additive answers to proportional problems. Traditionally, these additive answers have been interpreted as an indication of a lack of mastery of proportional reasoning. From a developmental perspective, additive reasoning is often assumed to naturally and necessarily precede multiplicative and proportional reasoning. However, this has recently been questioned. Children are able to reason proportionally much earlier than traditionally assumed, and the use of additive and proportional reasoning strongly depends on educational factors. The current symposium presents recent research findings to shed light on these issues. The studies will show how the spontaneous choice for additive strategies can be considered to be a meaningful step towards proportional reasoning, how the early capacities for proportional reasoning in children can be facilitated by the use of adequate external representations, how an early understanding of ratios can be seen as a valuable precursor for understanding fractions, and how the use of various strategies may facilitate the emergence of a concept of proportionality.

Solving mathematically-neutral problems by multiplicative reasoning, additive reasoning, or both?

Quantitative methods,Student learning,Numeracy,Mathematics,Primary education

Tine Degrande, KU Leuven, Belgium; Lieven Verschaffel, KU Leuven, Belgium; Wim Van Dooren, KU Leuven, Belgium;

We studied the development of learnersí spontaneous multiplicative and additive Quantitative Analogical (QA) reasoning. We offered 366 third, fourth, fifth and sixth graders in primary education four schematic problems in which three values were given and a fourth one had to be found. All problems had a multiple-choice and multiple-answer format, offering a multiplicative, additive and distractor solution. The schematic problems were all neutral in terms of their mathematical model, but differed with respect to their schematic representation (i.e. twodimensional arrow scheme or onedimensional number line) and the number characteristics of the given numbers in the problem (i.e. integer or non-integer number ratios). Our findings showed that the majority of all answers was additive, but also multiplicative and even multiplicative-and-additive answers were given. Moreover, multiplicative and multiplicative-and-additive answers increased with grade, whereas additive answers decreased with grade. Also the problem characteristics played a role, in the sense that arrow schemes evoked more multiplicative and less additive answers than number line representations, just like problems with integer number ratios compared to problems with non-integer ratios. These findings highlight the importance of spontaneous additive reasoning, next to spontaneous multiplicative reasoning, as another way of QA reasoning. Future research should further study the interplay of multiplicative QA and additive QA reasoning in several kinds of mathematically-neutral problems and across grades.

Childrenís intuitions for comparing ratios: A study with second-grade children

Quantitative methods,Student learning,Numeracy,Mathematics,Primary education

David Maximiliano Gomez Rojas, Universidad de Chile, Chile; Pablo Dartnell, University of Chile, Chile;

A robust understanding of complex mathematical topics, such as rational numbers, requires rich notions of ratio and proportionality. In this study, we assessed young childrenís quantitative intuitions about ratio by means of a ratio comparison task. Ratios were presented using fraction-like symbols, which children learned to interpret as ratios of candies per day by means of five brief audiovisual recordings. We asked whether this novel, intuitive context would lead to a Natural Number Bias (NNB) in childrenís reasoning. The NNB has been amply documented in the context of learning fractions, but no studies so far have focused on its emergence in children before formal instruction of this topic. We thus worked with 40 second-grade Chilean children from a middle-income urban school. Data from a 12-item test showed that in average, childrenís intuitions were successful for comparing ratios at above-chance levels. Nonetheless, a clustering analysis further revealed the presence of distinct groups of children: whereas some of them answered most items correctly, possibly reflecting a good understanding of the required notions for comparing ratios, other childrenís answers were strongly affected by a NNB. A third group seemed to focus only on the number of days represented in each symbol. These data uncover important individual differences among children in intuition-based mental calculation about ratios. Moreover, all three groups match those found in previous studies with older children comparing fractions, although the underlying processes might not coincide.

Exploring the Impact of Knowledge of Multiple Strategies on Studentsí Learning about Proportions

Quantitative methods,Student learning,Numeracy,Mathematics,Primary education

Jon Star, Harvard University, United States;

Proportional reasoning is widely considered to be a major goal of mathematics education in the middle grades. The literature identifies three strategies that are commonly used by students in solving simple proportion problems: cross multiplication, equivalent fractions, and unit rate. In past research, scholars have expressed concern that students rely too heavily on cross multiplication when solving these types of problems and have advocated delaying instruction on cross multiplication in favor of both the unit rate and equivalent fractions strategies. As part of a study evaluating a six-week curriculum unit on ratio, proportion, and percent problem solving, we assessed studentsí strategy repertoire for solving proportion problems and the extent to which studentsí prior knowledge of one or more strategies impacted their learning from the curricular intervention. Results indicated that students relied almost exclusively on the equivalent fractions strategy for solving simple proportion problems, and that students who had prior knowledge of more than one strategy learned more from the intervention than those who knew one or no strategies.

Promoting a functional understanding of proportions among primary school students

Qualitative methods,Student learning,Numeracy,Mathematics,Primary education

Terezinha Nunes, University of Oxford, United Kingdom; Peter Bryant, Oxford University, United Kingdom; Laura Gottardis, University of Oxford, Italy; Maria Emmanuela Terlektsi, University of Oxford, United Kingdom; Deborah Evans, University of Oxford, United Kingdom;

Proportion problems are problems in which two quantities are related by a fixed ratio. Two types of relation can be used to solve proportions problems, scalar or functional relations. The two original quantities in a proportions problem can also give rise to a third quantity, an intensive quantity, in which the unit establishes a relation between the original quantities (e.g. price per balloon). Scalar relations are easily understood but insight into the functional relation is necessary for a complete understanding of proportions. However, this insight is not easily attained. In an intervention study, we attempted to use the notion of intensive quantity as a step towards understanding functional relations. 22 6th graders participated in small group teaching sessions in which they used the ratio table to represent quantities and relations in proportions problems. The focus was initially on scalar relations but shifted to intensive quantities and functional relations during instruction. Qualitative analyses confirmed that scalar relations were easily understood. When guided to think about intensive quantities and functional relations, pupils managed to express these verbally, but in later problems reversed to their preference for scalar solutions, even when these were computationally demanding. Students' comments demonstrate a distinction between understanding intensive quantities, which are applied by students only at the unit level, and functional relations, which can be applied to any pair of values in the problem. The idea of intensive quantity was rejected by some students when it did not refer to something that made sense in the culture.

J 8

28 August 2015 08:45 - 10:15

Room Green_A4

Symposium

Higher education

Transition to higher education: A dynamic and in-depth understanding of the first-year experience

Keywords: Achievement,At-risk students,Higher education,Motivation and emotion,Qualitative methods,Social interaction

Sig's: SIG 4 - Higher Education

Chairperson: Vincent Donche, University of Antwerp, Belgium

Organiser: Mikael De Clercq, Universite catholique de Louvain (UCL), Belgium

Discussant: Linda Price, Open University, United Kingdom

Students' transition to higher education (HE) is a crucial and challenging phase which implies several social, motivational, behavioral and cognitive changes in order to adjust to the requirements of the new academic environment. Numerous freshmen struggle with this transition and fail the first year (FY) or drop out from university. A vast body of research tackles this issue and identified several factors playing a major role in successful transition. Yet, most existing research investigated the influence of these factors without considering their interrelations and changes over the FY. Moreover, students' transition was essentially considered through the global lens of achievement leaving detailed depiction of transition's requirements underinvestigated. To contribute to these research gaps, the proposed symposium aims at expanding our understanding of transition to HE by proposing a dynamic perspective of student's FY-experience and an in depth investigation of academic requirements.To do so, the first paper will focus on interplaying factors in the first months of transition, the second paper will investigate motivation changes in the FY, the third paper will draw a holistic picture of the transition process while the fourth paper will identify critical requirements of transition from a disciplinary perspective. Using interrelated theoretical frameworks and qualitative and quantitative research perspectives, the four papers complement each other with providing a comprehensive view of students' FY experience in HE.The discussant will reflect upon the dynamic and in-depth perspectives on transition to HE and initiate a discussion on the nature of students' FY-experience and future perspectives in research.

Contributing factors of early academic success in social sciencesí first-year students

Achievement,At-risk students,Self-efficacy,Social sciences,Higher education

Jasperina Brouwer, University of Groningen, Netherlands; Ellen Jansen, University of Groningen, Netherlands; Adriaan Hofman , University of Groningen, Netherlands; Andreas Flache , University of Groningen, Netherlands;

Early signalling of study progress may help improve the performance rates of university students. An important question is how to monitor study progress at an early stage. Accordingly, the current study was aiming at identifying the contributing factors of early academic success. Early academic success was defined as the study results after 10 weeks and after the Fall semester of the first year. Two theoretical approaches were combined for determining factors that contribute to early academic success: the educational productivity model (Walberg, 1984, 1986) and the transition model (Nicholson, 1990). Questionnaires were administered at two moments to a sample of 407 first-year students at a faculty of social sciences. A hierarchical multiple regression analysis revealed evidence for most of the factors that were theoretically proposed to affect academic success positively: studentís aptitude, faculty climate, and time spent on self-study. The use of social media was found to affect academic success negatively. Prior achievement and consciousness were most beneficial for academic success, while home environment did not contribute to early academic success.

The interplay between studentsí integration and motivation during first year higher education

Achievement,Social interaction,Higher education,Motivation and emotion

Dorien Noyens, University of Antwerp, Belgium; Vincent Donche, University of Antwerp, Belgium; Liesje Coertjens, University of Antwerp, Belgium; Tine van Daal, Institute for Education and Information Sciences, Belgium; Peter Van Petegem, University of Antwerp, Belgium;

Studentsí integration and academic motivation are important factors to succeed in first year higher education. However, first-year students are confronted with a necessity to adjust their learning behaviour and attitudes to cope with their new learning environment. Little is known about the explanatory role of studentsí feeling of academic and social adjustment to their new learning environment and of the effects on studentsí motivation during first year higher education. This study aims to explore the interplay between studentsí integration and effects on academic motivation during first year higher education, by means of a longitudinal dataset (n=1103). Two aspects of studentsí integration were measured: social integration and academic integration, operationalized as studentsí perceived fit between secondary and higher education. Preliminary results indicate that studentsí social integration has a mediating effect on changes in studentsí autonomous motivation: first-year students who are more autonomously motivated at the start, tend to be more socially integrated during the first year, which in turn also increases their autonomous motivation at the end of the first year of higher education. Also social integration plays a mediating role with regard to studentsí amotivation: First-year students who are less amotivated at the start, tend to be more socially integrated during the first year which in turn further decreases their amotivation at the end of first year higher education. While the results of this study stress the mediating role of social integration on studentsí motivation, no significant effects of studentsí perceived fit were found.

Studentís adjustment process in first year at university: A qualitative and longitudinal approach

Qualitative methods,Student learning,Achievement,Emotion and cognition,Self-efficacy,Higher education

Mikael De Clercq, Universite catholique de Louvain (UCL), Belgium; Benoit Galand, Universite catholique de Louvain (UCL), Belgium; Mariane Frenay, Universite catholique de Louvain (UCL), Belgium;

The first year at university is a particularly challenging experience which requires quick studentís adjustment to the new academic context by coping with social, academic and administrative demands. Many freshmen struggle with this adjustment and fail or decide to leave higher education, which entail psychological and financial costs. First year experience in higher education has been extensively investigated in the literature and several variables were identified as predictors of academic achievement and retention. Yet, the majority of the studies focused on single factor analysis, restraining the comprehensive understanding of freshmen adjustment as a global and dynamic process. To overcome this limit, the current study used a longitudinal qualitative design in order to grasp the dynamic complexity of adjustment process. Semi-structured interviews were conducted in two steps with 17 freshmen from Science department. The aims were to unfold the constructs at play in studentís adjustment process and the dynamic interplay between them over time. The material was analyzed through thematic and sequential

analysis. The analyses were grounded into Expectancy-value theory and the Self-system process model. In accordance with theoretical background, preliminary results identified social integration, course value, self-efficacy beliefs, cognitive and behavioral engagement as major themes. Moreover, studentsí discourse revealed interplay between contextual characteristics (heavy workload, increased academic demandsÖ), self-efficacy beliefs and engagement across the year. The implications and limitations of this study will be discussed.

The first year in higher educationñ A disciplinary perspective on critical requirements for students

Qualitative methods,Achievement,Social sciences,Higher education

Caroline Trautwein, University of Hamburg, Germany; Elke Bosse, University of Hamburg, Germany;

Although research highlights the general importance of the first year in Higher Education (HE) for study success and retention, little is known about the specific requirements of the first year (FY) in German HE that are critical for successful transition and may be reasons behind drop-out from university. In their review on drop-out Ulriksen et al. (2010) conclude that the disciplinary culture plays a crucial role in studentsí (des)integration into HE and therefore in students transition into HE. Thus, the present study aims at investigating critical requirements (CR) for FY students under the perspective of disciplinary cultures. It is based on 50 semi-structured interviews with students as well as teaching and support staff from six faculties regarding critical incidents in the FY of HE. Firstly, a taxonomy of 32 CR which resulted from a thematic analysis of all interviews will be presented. It reveals content-related, personal, social and administrative CR. This taxonomy serves as point of reference for our quantitative analysis of code occurrence that compares the distribution of CR in six disciplinary fields. According to our findings interviewees from the faculties of Mathematics, Computer & Natural Sciences, Law and Medicine, mostly report personal CR, whereas for the faculties of Humanities, Economics & Social Sciences and Education mostly administrative CR are reported, which may be explained by organizational specifics in the disciplines but also disciplinary culture. The general dominance of personal and administrative CR as well as discipline-specific CR-imbalances may serve as starting points of academic development.

J 9

28 August 2015 08:45 - 10:15

Room Brown_B5

Symposium

Writing

Dialogic Spaces: an Examination of Metatalk about Writing

Keywords: Communities of learners,Language (L1/Standard Language),Social aspects of learning,Writing/Literacy

Sig's: SIG 12 - Writing

Chairperson: Debra Myhill, University of Exeter, United Kingdom

Organiser: Debra Myhill, University of Exeter, United Kingdom

Discussant: Judy M. Parr, University of Auckland, Faculty of Education, New Zealand

This symposium draws on a socio-cultural understanding of writing as a social practice, where what students learn when they are becoming writers is not simply a language system, but also the social practices of language instantiated within communities of practice. Specifically, this symposium explores the dialogic spaces opened up when writing instruction creates opportunities for metatalk, talk about writing, as a mechanism for deepening understanding of studentsí and teachersí thinking about writing. Building on Vygotskyís notion that learning is a mediated activity, shaped by social interaction, and that talk generates thought, the dialogic space is one where multiple meanings are explored and developed. The symposium considers the dialogic space in terms of three different levels of dialogic talk which may inform development in writing. Firstly, the textual, where we consider the multi-vocal nature of texts and how classroom talk about writing legitimates textual talk in different ways. Secondly, we consider the social interactions about text, both how teachers manage high-level dialogic metatalk about writing in the classroom and how teachers, through collegial discussion, develop a shared understanding of writing assessment and a shared language to express formative assessment of writing. Thirdly, we consider the individual voices of students, talking about their writing, and reflecting not only that teacher talk acts as a powerful mediator of studentsí capacity to comprehend the valued texts of schooling but also how students of varying ages and abilities reflect on their own writerly choices in light of their teachersí language-informed writing pedagogies.

Metatalk: Enabling Metalinguistic DIscussion about Writing

Qualitative methods,Teaching/instruction,Literacy,Language (L1/Standard Language)

Susan Jones, University of Exeter, United Kingdom; Debra Myhill, University of Exeter, United Kingdom;

Historically, theoretical consideration of metalinguistic understanding has scarcely addressed the issue in the context of writing, other than in relation to early years writing development where there is a substantial body of work. Consequently, there is very limited understanding of how older writers in the secondary or high-school phase of schooling develop metalinguistic understanding about writing. Arguably, writing is always an act of selecting, shaping, reflecting and revising (Myhill 2011) and thus draws on metalinguistic activity. Indeed, researchers such as Tolchinsky (2000) and Fortune (2005) have argued that metalinguistic activity is an inevitable element of text production ñ in other words, it is impossible to write without engaging in

metalinguistic activity at some level. Critical to the development of this metalinguistic understanding is how teachers manage ëmetatalkí, talk about language in writing, during instructional interactions around writing. This paper, drawing on data from a large national study, will explore the nature and efficacy of teachersí interactions with students and how they enable high-level metatalk to occur. The paper will contrast the close relationship between high-qualilty metatalk and open dialogic discourse roles for the teacher with less effective talk, characterized by more controlled, monologic and closed discourse around writing.

How Teachers open Classroom Spaces for the Inter-animation of Voices in Writing Instruction

Qualitative methods,Teaching/instruction,Literacy,Language (L1/Standard Language)

Rebecca Jesson, University of Auckland, New Zealand; Naomi Rosedale, University of Auckland, New Zealand;

From a socio-cultural perspective, students develop language and literacy expertise as they participate in actions, activities and exchanges within the socialising influences of groups of people (Gee, 2001). However, young peopleís significant repertoires of practice and acculturation into the ways of language may differentially position them to navigate unfamiliar, but highly valued, textual practices in classroom settings. Our aim is to situate ourselves in classrooms to understand how writing instruction might be refashioned to allow for dialogicity as a means of developing writers from diverse language and cultural backgrounds. In doing so, we offer a framing of writing instruction to consider textual, social and individual dialogic spaces, exploring the inter-animation of these various voices as an approach to building writersí agency and expertise.

Childrenís Meta-reflections on their Writing Choices

Qualitative methods,Teaching/instruction,Literacy,Language (L1/Standard Language)

Kristina Love, australian Catholic University, Australia; Carmel Sandiford, University of Melbourne, Australia;

Educational research within a social semiotic tradition (Halliday, 1994; Williams, 2005) has made visible the powerful mediating role of teachersí language in their studentsí learning, both about language and the world. Empirical studies exploring classroom interactions in secondary (Love, 2000, 2001) and primary (French, 2012) contexts further demonstrate the process whereby teacher talk, informed by varying insights into language structure AND function, acts as a powerful mediator of student capacity to produce and comprehend the valued texts of schooling. However, little empirical work has been done, apart from that of Myhill et al (2013) in the UK, linking teacher knowledge about language (KAL) and student capacity to reflect on their text production and comprehension. This paper reports on one component of a three year Australian Research Council funded project which sought to support teachers to build a deep knowledge about language and the associated pedagogies that would impact on studentsí writing outcomes. The project focussed on developing teachersí and studentsí understandings of the

ëgrammaticsí (Macken-Horarik, Love & Unsworth, 2011) of narrative (2011), persuasion (2012) and text response (2013). This paper focuses on student interview data as pupils of varying ages and abilities reflect on their own writerly choices in light of their teachersí language-informed writing pedagogies. The analysis of the transcripts of these interviews suggests that student capacity to reflect metalinguistically on their own writerly choices is related to the explicitness of the teachersí language-informed pedagogy.

Teachers' Dialogues about Students' Texts

Qualitative methods,Teaching/instruction,Literacy,Language (L1/Standard Language)

Synnove Matre, Sor-Trondelag University College, Norway; Randi Solheim, Sor-Trondelag University, Norway;

Assessment plays an important part in all writing education. However, teachersí feedback on studentsí texts may be of varying types and qualities, often indicating a shallow understanding of the complexity of both writing and assessment and a lack of metalinguistic awareness and language. To increase studentsí writing competence, teachers also need extended knowledge on writing and writing development, including what to expect of studentsí writing proficiency at different levels. This paper deals with the knowledge basis for formative assessment of writing, focusing on the teachersí part in the process; how they develop a shared understanding and a shared language. Through our analysis, we explore the dialogic space created by these teachersí social interactions around studentsí texts. We seek answer to how a sample of teachers from different subjects through collaborative assessment of studentsí texts develops assessment competence based on a functional understanding of writing, supported by assessment resources derived from this.

J 10

28 August 2015 08:45 - 10:15

Room Green_A2

Symposium

Language education

Learning and assessment in multilingual settings

Keywords: At-risk students,Bilingual education,Language (Foreign and second),Primary education,Quantitative methods,Secondary education

Sig's: SIG 21 - Learning and Teaching in Culturally Diverse Settings

Chairperson: Henrik Saalbach, University of Leipzig, Germany

Organiser: Julia Karbach, Goethe-Universitat Frankfurt, Germany

Discussant: Beno Csapo, University of Szeged, Hungary

Numerous studies have focused on multilingual learning and development. They have shown that bilingual students differ from their monolingual peers in terms of language abilities and cognitive development and they have also identified a number of linguistic and cultural differences relevant to learning and assessment in the classroom. However, many questions regarding the role of multilingualism for the academic development in specific domains (such as mathematics or complex problem solving) as well as in atypical development are still unanswered. Therefore, the aim of this symposium is to integrate new empirical quantitative findings in order to provide a state-of-the-art overview of individual and environmental variables that are relevant for multilingual learning and assessment. The first presentation (Engel de Abreu et al.) will focus on the cognitive profile of bilingual and monolingual elementary school students with specific language impairment (SLI) from three different countries. The second study (Gunzenhauser et al.) will target the influence of language abilities on complex problem-solving in bilingual elementary school students, and the third study (Sonnleitner et al.) will be on the advantages of computer-based assessment of complex problem solving skills in bilingual ninth-graders. Finally, the fourth study (Schneider et al.) will focus on math education and present data on the relations among fraction magnitude understanding, arithmetic, and general mathematical abilities in sixth and eighth grade students from three countries differing in educational practices. Beno Csap? will serve as the discussant.

Bilingualism and Specific Language Impairment: A cross-cultural study with low-income children

Quantitative methods,Bilingual education,Learning and developmental difficulties,Language (Foreign and second),Primary education

Pascale Engel de Abreu, University of Luxembourg, Luxembourg; Marina Puglisi, Federal University of Sao Paulo, Brazil; Debora Befi-Lopes, University of Sao Paulo, Brazil; Anabela Cruz-Santos, University of Minho, Portugal;

This study explores the cognitive profile of bilingual and monolingual children with Specific Language Impairment (SLI) from low income families. Participants were 124 eight-year-old Portuguese-speaking children from Luxembourg, Portugal, and Brazil: (1) 15 Portuguese-Luxembourgish bilinguals from Luxembourg with SLI; (2) 33 typically developing Portuguese-Luxembourgish bilinguals from Luxembourg; (3) 33 typically developing monolinguals from Portugal; (4) 18 monolinguals from Brazil with SLI; (5) 25 typically developing monolinguals from Brazil. Groups were matched on chronological age, socioeconomic status, and nonverbal intelligence. Children completed a range of measures tapping vocabulary, grammar, verbal and visuospatial working memory, and cognitive control. Results indicate that despite significant differences in their language and verbal working memory performance (SLI < typically developing children), groups exhibited comparable performance on visuospatial working memory tasks. On measures of cognitive control the bilingual typically developing group outperformed their monolingual peers and the monolingual SLI group showed deficits in contrast

to the typically developing groups. The bilingual SLI group did not manifest this same deficit but performed comparably to monolingual typically developing children. The data is consistent with the position that a bilingual experience stimulates the development of cognitive control that is involved in dealing with conflicting information. The findings indicate that mechanisms of cognitive control might be deficient in monolingual but not in bilingual children with SLI raising the possibility that bilingualism might represent a protective factor against some of the cognitive limitations in SLI.

Influences of Language Abilities on Complex Problem-Solving in Bilingual Elementary Students

Quantitative methods,Bilingual education,Problem solving,Language (Foreign and second),Primary education

Catherine Gunzenhauser, Leipzig University, Germany; Henrik Saalbach, University of Leipzig, Germany; Julia Karbach, Goethe-Universitat Frankfurt, Germany;

Despite of a possible bilingual advantage in executive functions, bilingual children are outperformed by their monolingual peers throughout elementary school. This might be due to bilingual childrenís weaker language abilities, which (in addition to impairing their ability to follow classes) might impede their use of verbal self-instructions during complex problem-solving tasks. In the present study, we aimed to investigate whether monolingual and bilingual children differ in their performance in a complex problem-solving task while taking into account language abilities. We used a dual approach: First, we statistically controlled childrenís language abilities in a correlative design. Second, we used an auditory interference paradigm to prevent children from using verbal self-instructions. Participants were N = 53 monolingual and N = 44 bilingual elementary students from Germany. As a complex problem-solving task, we used the Tower of London task (TOL). In a regular condition, children first said how many moves they would require, and then built their towers. In a verbal interference condition, children had to utter the word ìMondayî every second while planning their moves. Childrenís language abilities were assessed with short versions of the Peabody Picture Vocabulary Test and the Test for the Reception of Grammar. In a hierarchical linear regression controlling for childrenís gender, age, and language abilities, bilingualism significantly and positively predicted performance in the TOL regular condition. An ANCOVA with gender and age as covariates revealed that bilingual children outperformed monolingual children in the verbal interference condition. Implications for research and practice will be discussed.

Complex problem solving provides a fairer picture of multilingual studentsí cognitive potential

Quantitative methods,Bilingual education,Problem solving,Language (Foreign and second),Secondary education

Philipp Sonnleitner, University of Luxembourg, Luxembourg; Martin Brunner, University of Luxembourg, Luxembourg; Ulrich Keller, University of Luxembourg, Luxembourg; Romain Martin, University of Luxembourg, Luxembourg;

Most studies investigating cognitive performance in immigrant and multilingual students reveal a consistent disadvantage compared to their native peers (OECD, 2012, Schleicher, 2006). On the basis of a sample of ninth-graders (N = 299), including a representative number of immigrant students (N = 127), we investigated, whether such performance differences can also be found in a computer-based assessment that mainly draws on fairly novel task demands, offers different languages for taking the test, and minimizes the impact of language by using multimedia, interactive instructions. The students interacted with complex problem solving scenarios in which they had to learn about hidden connections between variables, to depict the gathered knowledge, and finally to apply the gathered knowledge to achieve certain targets. Comparable to previous studies in other domains, immigrant students showed a lower performance compared to their native peers when declaring and applying the gathered knowledge. However, they outperformed their peers in terms of efficiency when exploring and interacting with the problem scenarios. Moreover, performance in these scenarios was less affected by the academic background than were conventional, static reasoning tasks. Thus, especially process-based measures of studentsí task exploration behavior might be a more appropriate indicator of multilingual studentsí cognitive potential.

Fraction magnitude understanding is central to mathematical achievement in three countries

Quantitative methods,Teaching/instruction,Numeracy,Language (Foreign and second),Secondary education

Michael Schneider, University of Trier, Germany; Joke Torbeyns, KU Leuven, Belgium; Robert Siegler, Carnegie Mellon University, United States;

In the domain of whole numbers, magnitude understanding, arithmetic and mathematical achievement are closely intertwined. This finding has been interpreted as evidence for the fact that magnitude understanding gives learners intuitions about numbers and their interrelations, the so-called number sense, which then fosters and guides the base for the acquisition of more advanced mathematical concepts and skills in instructional contexts. The integrated theory of numerical development suggests that the same holds true for numerical fractions. This is far from self-evident as fractions are much harder to understand for students than whole numbers, and both types of numbers differ in their fundamental mathematical characteristics, such as successor relations and density. In the current study, we investigated relations among fraction magnitude understanding, arithmetic and general mathematical abilities in countries differing in their instructional languages and their educational practices: U.S., China and Belgium. Despite strong country-specific differences in the absolute levels of fraction knowledge, 6th and 8th gradersí fraction magnitude understanding was positively related to their general mathematical achievement in all countries, and this relation remained significant after controlling for fraction arithmetic knowledge in almost all combinations of country and age group. These findings suggest that instructional interventions should target learnersí interpretation of fractions as magnitudes, e.g., by practicing translating fractions into positions on number lines.

28 August 2015 08:45 - 10:15

Room Green_A3

Symposium

Social interaction in L&I

Observing and fostering teachersí diagnostic competence in teacher-student interactions

Keywords: Mixed-method research,Social interaction,Teacher professional development,Teaching/instruction

Sig's: SIG 10 - Social Interaction in Learning and Instruction

Chairperson: Janneke van de Pol, Utrecht University, Netherlands

Organiser: Bas Agricola, Utrecht University, Netherlands

Discussant: Anna Suedkamp, TU Dortmund University, Germany

Introduction Diagnosing students' learning is one of the most important teaching skills for two main reasons (Krolak-Schwerdt, Glock, & B?hmer, 2014). First, teachers' diagnoses have a huge impact on important decisions concerning students' learning. Second, precise diagnosis allows teachers to adapt their teaching to students' individual needs. However, the accuracy of teachers' diagnoses is relatively low with large differences between teachers (S?dkamp, Kaiser, & M?ller, 2012). Therefore, more research is needed into: (1) diagnostic competence in teacher-student real-time interaction as this is the level at which teachers can actually change their behavior, and (2) the fostering of diagnostic competence. Coherence of the Symposium The first paper explores teachers' diagnostic behavior during teacher-student dialogues in higher education. The second paper investigates the diagnostic competence of kindergarten teachers during children's play. The third and fourth paper present intervention studies with pre-service teachers and secondary school teachers whose diagnostic competence is trained. Aims and Scientific and Educational Relevance Research has shown that teachers lack effective diagnosing techniques. The practical significance of this symposium lies exactly in the need for empirical evidence how to strengthen teachers' diagnostic competence. This symposium seeks to arrive at a deeper understanding of what diagnostic competence looks like in interaction. The symposium will result in insights in effective arrangements for teachers' diagnostic competence development.

Diagnosing studentsí understanding: Exploring teacher behaviour during teacher-student dialogues

Case studies,Teaching/instruction,Social interaction,Higher education

Bas Agricola, Utrecht University, Netherlands; Frans Prins, Utrecht University, Netherlands; Marieke van der Schaaf, Utrecht University, Netherlands; Johannes van Tartwijk, Utrecht University, Netherlands;

In higher education students often have teacher-student dialogues when they write their bachelorís thesis. During teacher-student dialogues teachers ideally use diagnostic moves to diagnose studentsí knowledge, abilities and skills in order to be able to provide tailor-made interventions. When teachers adapt their support based on an adequate diagnosis, they are teaching adaptively. An exploratory multiple case study was carried out with qualitative data from 16 videotaped teacher-student dialogues. Participants were 4 teachers who had teacher-student dialogues with 31 students. This study aimed to explore which adaptive teacher moves were used and to answer the questions how teachers used the three diagnostic moves and how they differed in their use of the three diagnostic moves. All 16 dialogues were coded for four teacher moves: (1) diagnostic question, (2) diagnosis, (3) diagnostic check and (4) intervention. The coded dialogue results were compared within and between teachers. A total of 1963 units of meaning were coded and results showed that teachers mainly used intervention moves during their dialogues; they used several diagnostic questions and scarcely diagnoses and diagnostic checks. Teachers seldom articulated their diagnoses explicitly and mainly applied intervention moves. A reason for these findings might be the lack of sufficient diagnostic knowledge and skills. The two experienced teachers applied less diagnostic questions than the inexperienced ones; it seems experienced teachers may rely too much on their expert knowledge and could make wrong assumptions about studentsí understanding.

Diagnosing students' quantity-number competences for individualised learning support in kindergarten

Video analysis,Teaching/instruction,Mathematics,Early childhood education

Andrea Wullschleger, University of Zurich, Switzerland; Rita Stebler, University of Zurich, Switzerland;

Children differ greatly in their mathematical competences when they begin kindergarten (Stamm, 2004). It is of major importance to address such differences because mathematical pre-knowledge has proven to be a crucial factor in childrenís performance in primary school math (Dornheim, 2008). One option for a suitable intervention for children of this age lies in play (Stebler et al., 2013), which is why games aimed at fostering quantity-number competences were developed and tested in the joint-international project spimaf (play-based mathematical early intervention). From a social-constructivist point of view, games cannot on their own foster children in their competence development. It is the individualised learning support given by the teacher that plays a key role, especially in kindergarten (Sylva et al., 2004). The diagnosis of childrenís current level of competence provides the basis for this support (Van de Pol, Volman & Beishuizen, 2011). Against this background, the dissertation project investigates the individualised mathematics learning support given by the kindergarten teacher during childrenís play. For the symposium the focus is on the formative assessment of childrenís quantity-number competences in order to support their development individually. The research is based on video data. In twenty-eight kindergarten classes play sequences (N = 356) were videotaped. The

teacher-child interactions with mathematical content were analysed with a self-developed rating instrument. The findings are expected to indicate possibilities for individualised learning support in early mathematics education.

Training preservice teachers: Effects on interaction and diagnosis in one-on-one tutoring

Experimental studies,Pre-service teacher education,Teaching/instruction,Biology

Anna Altmann, University of Freiburg, Germany; Christiane Stapp, University of Freiburg, Germany; Stephanie Herppich, University of Freiburg, Germany; Joerg Wittwer, University of Freiburg, Germany; Matthias Nuekles, University of Freiburg, Germany;

One-on-one tutoring provides tutors with the opportunity to formatively diagnose a tuteeís understanding, which is important for the teachers to adapt to the student and for the studentís learning. A prerequisite for formative assessment is that the student is able to verbalize his/her knowledge and thoughts. Many findings suggest that teachers tend to dominate the dialog with their students, thereby reducing the chance of making the studentís thinking visible. In an experimental study with preservice biology teachers, we conducted two kinds of trainings on the topic of formative assessment and interactional strategies (experimental condition with a computer-based training and control condition with only theoretical information). We expected differences in the preservice teachersí and ñ as a consequence ñ in the studentsí communicative behavior. Also, we predicted a relation between the number of deep interaction episodes in which student and teacher work collaboratively on one topic and teachersí assessment accuracy. As predicted, we found that teachers in the experimental training group showed a less dominating communicative behavior in the dialog than the teachers in the control group. The smaller number of explanations in the experimental condition partially explained the number of studentsí actions in the dialog. Also, we found a relation between the number of deep interaction episodes in the teacher-student-dialog and assessment accuracy. Our findings suggest that even a short training can enhance teachersí interactive behavior in dialog and thereby influence studentsí behavior. Therefore, it should be considered to implement trainings on formative assessment in teacher education.

Diagnosing at school: What teachers do in their classroom after participating in a training program

Mixed-method research,Teacher professional development,Teaching/instruction,Secondary education

Julia Klug, Universitat Wien, Austria;

Diagnosing is one of teachersí most central tasks. So far, teachersí judgment accuracy of studentsí achievement has often been investigated (e.g., Spinath, 2005; Sudkamp, Kaiser, & Moller, 2012). In this study, forty-seven secondary school teachers participated in a training program that takes a new perspective on teachersí diagnostic competence based on a recently evaluated process model which accounts for studentsí learning behavior (Klug et al., 2013). A subgroup of fifteen teachers worked for four weeks on standardized diaries. In the diaries,

teachers were prompted to reflect upon their diagnostic action every day at school. In this paper, we are interested in the actions teachers actually applied in their classroom. Being asked in an open ended format which techniques they were able to apply easily in class each day and how they proceeded in applying them, teachers reported 96 applied techniques over time. Teachers most often applied techniques of reflecting and trying to avoid judgment biases (31%), followed by systematic observation (15%; half of it using observation forms), using methods like e.g. rubrics and reflecting the process of diagnosing (7% each). Other techniques were mentioned rarely. Results correspond with quantitative data resulting from structured diary items. Some strategies seem to be easier to implement in class than others: especially the ones that follow a diagnosis and concern adapting class, giving feedback and planning promotion are harder to apply and therefore used rather rarely. Thus, we need more intense training and supervision especially in those techniques following a diagnosis.

J 12

28 August 2015 08:45 - 10:15

Room Brown_B4

Symposium

Self-regulation

Perspectives on studentsí and teachersí self-regulated learning in the classroom

Keywords: Cognitive skills,Metacognition,Mixed-method research,Self-regulation

Sig's: SIG 16 - Metacognition

Chairperson: Bracha Kramarski, Bar-Ilan University, Israel

Organiser: Bracha Kramarski, Bar-Ilan University, Israel

Organiser: Irini Dermitzaki, University of Thessaly, Greece

Discussant: Annemie Desoete, Ghent University & Artevelde University College, Belgium

Self-regulated learning (SRL) can lead to success in school. Teachers can play a prevalent role in stimulating SRL. The contributors in this symposium investigate determinants and practices that promote SRL in the classroom focusing on both students and teachers. Evidence from one exploratory and three intervention studies is presented from a socio-cognitive perspective of SRL. Vandevelde and Van Keer investigate teacher-, class-, and school-related factors that facilitate or hamper the implementation of SRL practices by primary school teachers. They conclude that SRL is limitedly stimulated. Gonida, Kiosseoglou, and Papakyriakidou tested the effects of metacognitive training for kindergarten teachers and methods to foster metacognition in their students. The benefits of the intervention were related to students' age, verbal ability, and

socioeconomic status. Dermitzaki and Kriekouki 's study aimed at implementing a training program to foster students' skills to self-regulate reading comprehension and to train their teachers to apply the program in the classroom. Significant gains in students' SRL skills in reading comprehension and in respective performance are reported. Kramarski and Shilo examined the effects of different meta-cognitive teaching approaches on teachers and their students' metacognition, and self-efficacy beliefs toward teaching and learning. Findings indicated that teachers' ability to cultivate learners' metacognition is tied to teachers' own metacognition. The four studies add different perspectives in understanding the interplay of SRL concepts and propose ways for promoting students' and teachers' SRL at different ages.

Promoting self-regulated learning: A challenging endeavour for primary school teachers

Quantitative methods,Synergies between learning, teaching and research,Self-regulation,Interdisciplinary,Primary education

Sabrina Vandevelde, Ghent University, Belgium; Hilde Van Keer, Ghent University, Belgium;

Self-regulated learning (SRL) has become an important educational goal. The extent to which teachers stimulate SRL and the factors facilitating or hampering the implementation of SRL practices is a challenging issue in both educational research and practice. Therefore, this study explores primary school teachersí activities in stimulating SRL and teacher, class, and school-level determinants hereof. 162 primary school teachers (83% were female, 17% male) from 17 Flemish schools completed the questionnaire questioning teacher and class-level factors influencing integration of SRL practice. School level determinants were investigated by means of interviews. Results reveal that SRL is only stimulated limitedly. Teachers holding developmental educational beliefs and acknowledging the value of SRL report more SRL practices. Also teachers in higher grades and with smaller classes integrate SRL more often. At school level, a clear shared opinion on SRL is reported as an important stimulating condition. Perceived pressure of time and work, diversity between pupils, and limited teacher willingness to change oneís practice are the most important barriers. Concluding, primary teachers encounter difficulties in promoting SRL and, therefore, need additional training and support

Can kindergarten teachers promote childrens' metacognitive skills? An in-class intervention study

Mixed-method research,Self-regulation,Interdisciplinary,Early childhood education

Eleftheria Gonida, Aristotle University of Thessaloniki, Greece; Grigoris Kiosseoglou, Aristotle University of Thessaloniki, Greece;

The effectiveness of an in-class intervention program aiming at promoting preschoolersí metacognitive skills was examined in the present study. A number of factors such as childrenís age, gender, family socioeconomic status, verbal abilities and theory of mind were taken into account. A total of 140preschoolers and their teachers (N=8), equally divided in the experimental and the control group, participated in the study. Four out of the eight preschool teachers had been extensively trained in metacognitive instructional practices and were coached to infuse them in

the daily activity program of their classrooms. The duration of the intervention was 3 months. The results indicated that the intervention significantly improved childrenís metacognitive skills and that the benefits of the intervention were higher for the older preschoolers, the children from high socioeconomic status and for those with higher verbal ability. Theory of mind was a significant positive predictor of childrenís metacognitive performance, especially for the children of the experimental group. The results will be discussed in light of current theory and evidence in metacognitive and self-regulation intervention programs. Special emphasis will be given to the teachersí personal experiences at the end of the program

Fostering studentsí and teachersí skills for self-regulated learning in reading comprehension

Mixed-method research,Self-regulation,Reading comprehension,Primary education

Irini Dermitzaki, University of Thessaly, Greece; Maria Kriekouki, University of Thessaly, Greece;

This study aimed at implementing and evaluating a training program developed to: a. strengthen studentsí awareness and use of skills to self-regulate the reading comprehension process, b. train their teachers to apply the program in the classroom. Fifth and 6th grade students and their teachers participated in the study. The experimental group (three classes, n = 53) was trained by the researchers in skills reflecting the three phases of self-regulated learning (SRL) process, i.e., forethought, self-monitoring, and self-reflection. The control group (n = 56) received regular teaching. The teachers of the experimental group attended an introductory workshop on principles and practices of socio-cognitive approach of SRL and participated in the implementation of the program. The results of the study showed that, after the intervention, the experimental group reported increased use of self-regulatory skills in reading comprehension (RC) and showed a greater improvement in their RC performance in comparison to the control group. No significant differences between groups were found regarding self-efficacy in RC. After three months, a follow up study conducted with student interviews confirmed the positive effects of the intervention. The findings will be discussed within reference to studentsí and teachersí training in promoting SRL in the classroom

Interplay between Teachers and Students Metacognition in Mathematics: An Intervention Study

Mixed-method research,Synergies between learning, teaching and research,Metacognition,Mathematics,Primary education

Bracha Kramarski, Bar-Ilan University, Israel; Anat Shilo, Bar Ilan University, Israel;

The study examined the effects of fostering metacognitive "Knowledge of Cognition" and "Regulation of Cognition" on teaching mathematics in elementary school and on students' achievements. In addition, the meta-cognitive abilities and self-efficacy beliefs towards teaching and learning were investigated on immediate and lasting effects. The study included 48 math teachers in elementary schools and 1220 of their students. The students learned "number sense"

in three research groups. Two of them were exposed to different meta-cognitive teaching approaches based on self-questioning models: (1) an approach that emphasizes "Knowledge of Cognition" with a linear questioning model directed to declarative, procedural and conditional knowledge; (2) an approach that emphasizes "Regulation of Cognition" with a cyclical questioning model directed to planning, monitoring and reflection; and (3) a control group that learned without any meta-cognitive instruction. Mixed method analysis indicated that teachers and students of the two metacognitive groups outperformed the control group in all kind of measures (mathematics, metacognition and beliefs). The "Regulation of Cognition" group outperformed the "Knowledge of Cognition" group in most measures, in particular on metacognitive measures and self-efficacy beliefs immediately after the training and in the lasting effects. Generally, similar gains between teacher's mathematics knowledge, beliefs, and metacognitive improvement and their student's gains were found. The study has theoretical and practical contribution for metacognition understanding and mathematics education

J 13

28 August 2015 08:45 - 10:15

Room Green_A5

Symposium

Mathematics education

SFON and the development of early numeracy: The contributions of cognitive and educational factors

Keywords: Cognitive development,Early childhood education,Numeracy

Sig's: SIG 5 - Learning and Development in Early Childhood

Chairperson: Minna M Hannula-Sormunen, University of Turku, Finland

Organiser: Minna M Hannula-Sormunen, University of Turku, Finland

Organiser: Joke Torbeyns, KU Leuven, Belgium

Discussant: Bert De Smedt, University of Leuven, Belgium

Research on mathematical development during early childhood, especially the study of early developmental factors, still seriously lags behind research on young children's literacy precursors. To enable early diagnosis and prevention of mathematical disabilities, studies delineating the early predictors of later success are urgently needed. This symposium focuses on one such developmental element, Spontaneous Focusing On Numerosity (SFON) that has been shown to be related to the formation of individual differences in early numeracy (Hannula & Lehtinen, 2005). It consists of four empirical studies on SFON in relation to 2- to 5-year-olds'

early mathematical development. Notwithstanding their common focus, the different contributions vary in theoretical and methodological details as well as educational context, significantly broadening and deepening our understanding of young children's early mathematical development. First, Batchelor et al. and Sella et al. investigate the cognitive mechanisms by which SFON may influence numerical development, whereas Bojorque et al. and Torbeyns et al. study SFON in different educational contexts on SFON. Furthermore, this set of cross-sectional and longitudinal studies involve sophisticated analysis techniques including analyses of hierarchical regressions and Coefficient of Variation, as well as qualitative analyses of children's spontaneous numerical utterances. Moreover, as the different studies are conducted in four different countries with variable educational environments, they contribute to the generalizability of previous findings on SFON. Methodological aspects in evaluating children's spontaneous activities will be discussed, as will the theoretical and practical issues that emerge from considering this aspect of children's numerical behavior in the research and practice of early education.

Why is SFON associated with an arithmetic advantage?

Quantitative methods,Cognitive skills,Developmental processes,Numeracy,Mathematics,Early childhood education

Sophie Batchelor, Loughborough University , United Kingdom; Matthew Inglis, Loughborough University, United Kingdom; Camilla Gilmore, Loughborough University, United Kingdom;

ëSpontaneous Focusing on Numerosityí (SFON) is emerging as a key factor for explaining variations in childrenís early numerical development. However, the mechanisms behind this relationship are not yet clear. Here we report a study which examined why SFON is associated with a symbolic number advantage. Children aged 4-5 years (N=121) completed a battery of tasks designed to assess SFON and a range of mathematical skills. Results showed that SFON was positively associated with childrenís symbolic numerical processing skills and their performance on a standardised test of arithmetic. Hierarchical regression analyses demonstrated that the relationship between SFON and symbolic mathematics achievement can be partly explained by individual differences in childrenís nonsymbolic numerical processing skills and their ability to map between nonsymbolic and symbolic representations of number. This suggests that SFON is associated with a symbolic number advantage in part because of nonsymbolic skills and mapping skills.

Preschoolers' SFON, Subitizing and Counting Skills as Predictors of Math Skills 7 Years later

Cognitive development,Developmental processes,Numeracy,Mathematics

Erno Lehtinen, University of Turku, Finland; Pekka Rasanen, Niilo Maki Institute, Finland; Minna M Hannula-Sormunen, University of Turku, Finland;

This 7-year longitudinal study examined how childrenís spontaneous focusing on numerosity (SFON), subitizing based enumeration, and counting skills assessed at the ages of 5 or 6 years

predict their school mathematics achievement at the age of 12. The participants were 36 Finnish children without diagnosed neurological disorders. The results, based on partial least squares modeling, demonstrate that SFON and verbal counting skills before school age predict mathematical performance on a standardized test for typical school mathematics in grade 5. After controlling for non-verbal IQ, only SFON predict school mathematics. Subitizing-based enumeration skills have an indirect effect via number sequence skills and SFON on mathematical performance at the age of 12 years. Early mathematical skills do not predict reading skills at the age of 12 years. Childrenís early numerical skills, including SFON, before school age are important contributors to substantially later success in school mathematics.

SFON and math skills in Ecuadorian Kindergartners: Role of school type and quality of instruction

Student learning,Cognitive development,Developmental processes,Numeracy,Mathematics

Gina Bojorque, KU Leuven, Ecuador; Joke Torbeyns, KU Leuven, Belgium; Minna M Hannula-Sormunen, University of Turku, Finland; Daniel Van Nijlen, KU Leuven, Belgium; Lieven Verschaffel, KU Leuven, Belgium;

This study aimed at exploring the development of Ecuadorian Kindergartnersí spontaneous focusing on numerosity (SFON) during the Kindergarten year, in relation to the development of their math skills, school type and quality of math education. Participants were 179 Kindergartners from public urban, public rural and private schools. At the beginning and at the end of the school year, children received an Imitation SFON task and an early math achievement test (TENA; fitted to the Ecuadorian Kindergartenís national standards for number and arithmetic). The quality of childrenís math education was assessed via the Classroom Observation of Early Mathematics Environment and Teaching (COEMET) instrument. Our results, first demonstrated poor SFON performances at the start and the end of the school year , with school type differences in SFON performances at the end of the school year. We next found positive and stable relations between childrenís SFON at the start and the end of the school year, but only for children attending private and public rural schools. Third, we observed positive correlations between children/s SFON and their math skills at the start and the end of the school year, with no school type differences at the end of the school year. Finally, we did not observe differences in the quality of math education between the school types, but the quality of math education was a significant predictor of children/s SFON tendency at the end of the school year. The scientific and practical implications of these results are discussed.

Kindergartnersí SFON and their number-related utterances during picture book reading

Cognitive skills,Developmental processes,Numeracy,Mathematics,Early childhood education

Joke Torbeyns, KU Leuven, Belgium; Sanne Rathe, KU Leuven, Belgium; Minna M Hannula-Sormunen, University of Turku, Finland; Lieven Verschaffel, KU Leuven, Belgium;

Young childrenís spontaneous focusing on numerosity (SFON) is an important predictor of their mathematical development up to the end of primary school (Hannula-Sormunen, 2013; Hannula,

Lepola, & Lehtinen, 2010). This predictive relation is hypothetically explained by childrenís SFON in daily-life activities, offering them ample opportunities to further practice and develop their mathematical competencies in daily-life. We aimed at investigating the relation between Kindergartnersí SFON as assessed via an experimental SFON task and their spontaneous number-related utterances during daily-life activities, i.e., picture book reading. Fifty-five 4-5-year olds were individually offered two tasks, i.e., an experimental SFON Imitation task (Elsi Bird task; Hannula & Lehtinen, 2005) and, two weeks later, a joint picture book reading activity (ìBoer Boris [Boris the farmer]î; van Lieshout & Hopman, 2013). We expected differences in both the quantity and the quality of the spontaneous number-related utterances during picture book reading among children with different SFON-tendencies, with children of higher SFON level providing more and richer number-related utterances than their peers of lower SFON level. We observed large inter-individual differences in both Kindergartnersí SFON and the number and type of their spontaneous number-related utterances during picture book reading. Based on the analyses completed, we did not find empirical support for the assumed relation between Kindergartnersí SFON and the quantity and quality of their spontaneous number-related utterances. These unexpected results are discussed in terms of their methodological and educational implications.

J 14

28 August 2015 08:45 - 10:15

Room Cyan_F1

Symposium

Higher education

Examining factors related to stress, workload and exhaustion among university students

Keywords: Higher education,Learning approaches,Self-efficacy,Student learning

Sig's: SIG 4 - Higher Education

Chairperson: Liisa Postareff, University of Helsinki, Finland

Organiser: Anna Parpala, University of Helsinki, Finland

Discussant: Eva Kyndt, University of Leuven, Belgium

Interest in students' well-being has recently been growing among researchers in the field of higher education. As the university students may perceive academic life stressful and demanding, stress, workload and exhaustion have become important factors affecting students' well-being. Moreover, there is empirical evidence that increased stress can have a detrimental impact on the academic performance. This symposium sheds light on how to reduce student stress and

workload by examining the stress, workload and exhaustion in relation to contextual factors, student learning and self-efficacy beliefs. Moreover, the symposium clarifies the relationship between the stress and student learning. Although stress has been examined in a variety of settings and populations the university students have not been in focus in stress-related research. Thus, the symposium will add our knowledge about stress and exhaustion among university students.

First-year university studentsí studying, exhaustion, conscientiousness and self-efficacy

Quantitative methods,Student learning,Self-efficacy,Social aspects of learning,Higher education

Milla Raisanen, University of Helsinki, Finland; Liisa Postareff, University of Helsinki, Finland; Sari Lindblom-Ylanne, University of Helsinki, Finland;

The study explores what kind of cognitive-motivational profiles can be found among first-year university students and whether students with different profiles differ in exhaustion, conscientiousness and self-efficacy beliefs. The participants of the study were 186 first-year university students of bioscience, mathematics, medicine and dentistry. The students filled in a questionnaire including items concerning self- and co-regulation of learning, cognitive and attributional strategies, approaches to learning, exhaustion, conscientiousness and self-efficacy beliefs. Latent profile analysis was used for clustering students into groups based on the combinations of self- and co-regulation, cognitive and attributional strategies and approaches to learning. One-way ANOVAs were conducted in order to explore group differences in exhaustion, conscientiousness and self-efficacy beliefs. Three groups of students with different cognitive-motivational profiles were identified. The results demonstrated that students with different cognitive-motivational profiles varied in terms of exhaustion, conscientiousness and self-efficacy beliefs. The students, who showed the highest levels of self-regulation, a deep approach to learning, organised studying and experiences of the availability of peersí support, displayed the lowest levels of exhaustion and the highest levels of conscientiousness and self-efficacy beliefs. The students, who reported the highest levels on problems in self-regulation, a surface approach to learning and relied on other studentsí support, showed the highest levels of exhaustion and the lowest levels of conscientiousness and self-efficacy beliefs. The results imply that by recognising cognitive-motivational profiles of university students it is possible to identify students who need more support at the beginning of university studying.

Approaches to learning and perceived stress among first-semester psychology students

Quantitative methods,Student learning,Learning approaches,Higher education

Maria Ohrstedt, Stockholm University, Sweden;

Previous research suggests an interplay between studentsí well-being, learning activities, and learning outcomes. This study explores the linkages between studentsí approaches to learning, perceived stress, as well as expected and final grades within a sample of first-semester psychology students at a Swedish university. The results suggest that students adopting surface approaches to learning perceive higher levels of stress, while strategic approaches seem

associated with lower levels of perceived stress. There was no association between deep approaches to learning and perceived stress. Students adopting surface approaches or reporting high levels of perceived stress expected lower course grades than students adopting deep or strategic approaches to learning. Students adopting surface approaches or perceiving high levels of stress typically overestimated their final course grades. The highest levels of perceived stress were reported by students who achieved quite good, but not excellent grades. The discussion relates these findings to the potential influence of various factors such as perceived demands and feelings of control. Possible practical applications of the findings are also discussed.

Approaches to learning and perceptions of the teaching-learning environment as predictors of stress

Quantitative methods,Student learning,Teaching/instruction,Learning approaches,Higher education

Kim Jesper Herrmann, Aarhus University, Denmark; Anna Bager-Elsborg, Aarhus University, Denmark; Anna Parpala, University of Helsinki, Finland;

Background: The relationship between approaches to learning and perceptions of the teaching-learning environment has been studied extensively in past decades. However, less is known about approaches and perceptions in relation to stress. Aim: The aim of the study was to explore the relationship between university studentsí experiences of severe stress, their approaches to learning and their perceptions of the teaching-learning environment. Sample: 4,339 students from a large, research intensive Scandinavian university. Methods: Approaches to learning and perceptions of the teaching-learning environment were measured using a modified an abbreviated version of the ETLQ. Students were also asked to report the frequency of severe stress symptoms. Results: Overall, multinomial logistic regression showed that positive perceptions of the teaching-learning environment were negatively related to experiences of stress. Especially, perceptions of constructive alignment, peer support, and relevance came out as statistically significant predictors of stress. Stress was also found to be related to a surface approach but not a deep approach. Surprisingly, stress was also related to studentsí organised effort. Conclusion: Stress was associated with perceptions of the teaching learning-environment much as would be expected. However, stress was related to a surface approaches as well as organised effort suggesting a more complex relationship between approaches to learning and stress than expected.

Stress and workload in relation to perceived learning environment and approach to learning

Quantitative methods,Student learning,Teaching/instruction,Learning approaches,Higher education

Anna Parpala, University of Helsinki, Finland;

Perceived stress and workload are important factors affecting studentsí wellbeing. Earlier research has shown that perceived stress and workload are related to studentsí approaches to

learning and their experiences of the teaching-learning environment. The present study aims to explore the relationship between experiences of the teaching-learning environment, surface approach, workload, and stress in more detail. The participants were 326 university students who responded to the online Learn-questionnaire. The questionnaire contained items measuring approaches to learning, experiences of the teaching-learning environment, stress and workload. Mediation analyses were carried out using Structural Equation Modeling (SEM) with perceptions of the teaching-learning environment as independent variables, surface approach to learning as the mediating variable and stress and workload as the dependent variables. Our main finding was that when students perceived teaching as unaligned, they adopted the surface approach to learning, which then leads them to experience higher workload and stress in their studies. Thus, both teaching and learning need to be taken into consideration when trying to reduce the perceived workload in university studies.

J 15

28 August 2015 08:45 - 10:15

Room Brown_B6

Symposium

Technology-enhanced learning

Game-based learning in mathematics: Research from a media comparison and value-added approach

Keywords: Computer-assisted learning,Educational technology,Experimental studies,Game-based learning,Mathematics,Multimedia learning

Sig's: SIG 7 - Learning and Instruction with Computers

Chairperson: Ton de Jong, University of Twente, Netherlands

Organiser: Pieter Wouters, Utrecht University, Netherlands

Discussant: Mireille Betrancourt, University of Geneva, Switzerland

Theoretically, game-based learning (GBL) may influence learning in two ways, by changing cognitive processes and by affecting motivation. The assumption in this symposium is that we can only understand the impact of GBL on cognitive processes and motivation when we approach GBL from several perspectives: how does perform GBL in comparison to traditional learning environments (media comparison) and do specific manipulations in the GBL environment foster learning and motivation (value-added comparison). In four presentations we present the cognitive and/or motivational effects from a media comparison and a value-added approach. All contributions present empirical research and address factors and challenges that contribute to a better understanding of GBL in math education. Three presentations have a

valued-added approach. The studies in these presentations focus on learning proportional reasoning with the game ëZeldenrust'. ter Vrugte et al. investigate how collaboration (foster verbalization) and competition (foster engagement) affect learning. Wouters et al investigate whether surprising events yield playful learning. Vandercruysse et al. investigate whether integration of content into the game has a positive effect on learning and motivation. Finally, in a media comparison study Rodriguez Padilla et al. used the ëNumber Navigation Game' to investigate if the game experience influences arithmetic fluency and motivation.

Combining Collaboration and Competition with Prevocational Game-Based Math Education

Instructional design,Mathematics,Computer-assisted learning,Game-based learning

Judith ter Vrugte, University of Twente, Netherlands; Ton de Jong, University of Twente, Netherlands; Sylke Vandercruysse, KU Leuven, Belgium; Jan Elen, KU Leuven, Belgium; Pieter Wouters, Utrecht University, Netherlands; Herre van Oostendorp, Universiteit Utrecht, Netherlands;

The present study addressed the effectiveness of an educational math game for improving proportional reasoning in prevocational education, and examined the added value of face-to-face collaboration and competition. The study compared four conditions: the game with collaboration, with collaboration and competition, or with competition only, and the game without additional support. It was found that studentsí proportional reasoning skill improved significantly after playing the game. Though results did not favor one condition over the other, they did indicate that the two factors (competition and collaboration) interact. This interaction is significant for students with below average prior knowledge, demonstrating a negative effect of competition on the effect of collaboration.

The Role of Surprising Events in a Math-game on Proportional Reasoning

Experimental studies,Mathematics,Computer-assisted learning,Game-based learning

Pieter Wouters, Utrecht University, Netherlands; Herre van Oostendorp, Universiteit Utrecht, Netherlands; Judith ter Vrugte, University of Twente, Netherlands; Sylke Vandercruysse, KU Leuven, Belgium; Ton de Jong, University of Twente, Netherlands; Jan Elen, KU Leuven, Belgium;

This study examines whether surprising events can be used to stimulate studentsí playful learning in a GBL environment in the domain of proportional reasoning. The assumed effect of surprise is that unexpected events interrupt an expectation and therefore triggers the player to evaluate the new situation more extensively (enhanced retrieval and updating of an existing mental model). We hypothesized that a group with surprising events would outperform a group without surprising events on learning. Although we had to reject this hypothesis, a closer examination provides some evidence that the effect of surprising events may interact with the educational level of the student.

Content Integration as a Factor in Math-game Effectiveness

Experimental studies,Mathematics,Computer-assisted learning,Game-based learning

Judith ter Vrugte, University of Twente, Netherlands; Ton de Jong, University of Twente, Netherlands; Pieter Wouters, Utrecht University, Netherlands; Herre van Oostendorp, Universiteit Utrecht, Belgium; Lieven Verschaffel, KU Leuven, Belgium; Wim Van Dooren, KU Leuven, Belgium; Jan Elen, KU Leuven, Belgium; Sylke Vandercruysse, KU Leuven, Belgium;

In this study we focus on the integration of mathematical learning content (i.e. proportional reasoning) in a GBLE. More specific two kinds of GBLEs are set up; an extrinsically integrated GBLE and an intrinsically integrated GBLE. In the former environment, the mathematical content is not part of the core mechanics and structure of the gaming world. In the latter environment, the mathematical content is delivered through the parts of the game that are the most fun to play and embodied within the structure of the gaming world and the players interactions with it. Fifty-eight vocational track students participated in the study, all working in one of the two versions of the self-developed game-based learning environment ëZeldenrustí. The results of this study provide evidence for the effect of this different way of implementing learning content in an educational math game. More specific, students playing in an extrinsically integrated game show higher learning gains, motivational gains and perceived usefulness than students who played with a game in which the content was intrinsically integrated.

Game experience of the Number Navigation Game: Effects on arithmetic fluency and motivation

Experimental studies,Mathematics,Computer-assisted learning,Game-based learning

Nonmanut Pongsakdi, University of Turku, Finland; Jake McMullen, University of Turku, Finland; Tomi Jaakkola, University of Turku, Finland; Minna Hannula-Sormunen, University of Turku, Finland; Erno Lehtinen, University of Turku, Finland; Boglarka Brezovszky, University of Turku, Finland; Gabriela Rodriguez Padilla, University of Turku, Finland;

The Number Navigation Game (NNG) is a mathematical Serious Game designed to enhance studentsí flexible and adaptive arithmetic strategies and to increase motivation towards math. Fourth to sixth grade classrooms were randomly sorted into either an experimental group (students n=642) which played the game during a ten-week period or into a control group (students n=526) which continued with a traditional mathematics curriculum. The aims of this study were to: 1) describe the effect of an intervention on studentsí arithmetic fluency and motivation expectancy-values; 2) describe studentsí game experiences with the NNG; and 3) describe the effect of studentsí differing game experiences on their arithmetic fluency and motivation expectancy-values. Results indicate that regardless of the intervention, all participants showed an increase in arithmetic fluency and a decrease in motivation expectancy-values, although the intervention had a small effect in accentuating these changes. Studentsí game experiences indicate the importance of further developing the NNG, particularly as these game experiences moderated the effectiveness of the intervention in increasing motivation towards

math. Improvements in studentsí arithmetic fluency, however, were not dependent on game experiences.

J 16

28 August 2015 08:45 - 10:15

Room Brown_B3

Symposium

Higher education

Expertise development in the visual and performing arts

Keywords: Comprehension of text and graphics,Higher education,Learning in context,Lifelong learning,Professions and applied sciences,Social interaction

Sig's: SIG 14 - Learning and Professional Development

Chairperson: Iwan Wopereis, Open University of the Netherlands, Netherlands

Organiser: Markus Nivala, University of Regensburg, Germany

Organiser: Iwan Wopereis, Open University of the Netherlands, Netherlands

Discussant: Fritz Oser, Universitat Freiburg, Switzerland

Becoming an artist requires a combination of knowledge and (cognitive, perceptual, motor) skills. While this combination is not unique to arts, its internal composition may differ quite radically from other academic domains, as in arts the perceptual and motor skills are often of crucial importance. Furthermore, and in contrast to many other domains, reaching a certain performance level is not necessarily a sufficient condition for professional success. It is equally important to develop a personal style, an artistic identity. This symposium aims at understanding the development and underlying structure of artists' expertise, which are studied in terms of basic skills, deliberate practice and identity development. Huovinen et al. introduce two new eye-movement measures to investigate music reading and report on how the level of expertise interacts with context-dependent and stimulus-driven variables. The study by Gunthermann et al. investigates the development of visual expertise, but in the domain of sculpturing. Compared to Huovinen and colleagues, Gruber et al. investigate professional vision in music from a slightly different angle, i.e., how conductors study and prepare a musical score for an orchestra, and how this skill develops through deliberate practice. Finally, Wopereis et al. report on deliberate practice strategies of jazz musicians, and how these strategies enable them to build a personal voice. The symposium illuminates the different stages and dimensions of professional vision in visual and performing arts. Furthermore, it contributes to our understanding of learning processes and goals that typically get less attention in most academic domains.

Modeling Eye Movements during Skilled Music Reading: A Generalized Estimation Equation Approach

Experimental studies,Quantitative methods,Comprehension of text and graphics,Arts ,Higher education

Erkki Huovinen, Department of Music, University of Jyvaskyla, Finland, Finland; Anna-Kaisa Ylitalo, Department of Mathematics and Statistics, University of Jyvaskyla, Finland, Finland; Marjaana Puurtinen, University of Turku, Finland; Antti Penttinen, Department of Mathematics and Statistics, University of Jyvaskyla, Finland, Finland;

In this paper, we examine the effects of musical expertise, tempo, meter, and melodic grouping on eye movements during successful sight-reading performances of simple melodies, using a generalized estimation equations (GEE) approach. We also introduce two eye-movement measures developed specifically for the purposes of eye-movement research in music reading. In sum, greater musical expertise generally increased the distance between the point of gaze and the concurrent point of musical time (i.e., eye-beat span). Considering the allocation of fixation time on individual notes, expertise interacted with the stimulus-driven variables of melodic grouping and meter. In addition, performance tempo affected both our fixation measure and the eye-beat span through a similar interaction with the stimulus-driven variables. Overall, this study is the first to in examine in detail how performer-related, context-dependent and stimulus-driven variables interact in guiding the visual processing in simple music-reading tasks.

The gaze of the artist

Quantitative methods,Comprehension of text and graphics,Arts ,Higher education

Isabell Guntermann, University of Regensburg, Germany; Helen Jossberger, University of Regensburg, Germany; Hans Gruber, University of Regensburg, Germany; Birgit Eiglsperger, Department of Art Education, University of Regensburg, Germany , Germany;

For most people visiting an art museum is an exciting activity; artwork is perceived, analysed, and interpreted. Depending on prior knowledge and experience, individuals look at artwork differently. An artist or expert might see and focus on other aspects than a layperson or a novice. In this exploratory study, the eye movements and gaze patterns of laypersons, novices, semi-experts and experts while looking at two sculptures in a museum were investigated. The aim was to analyse the reception of sculptures and identify expertise-related differences in gaze patterns. Twenty persons, five in each group, participated. Eye tracking was applied in a three-dimensional setting and the following parameters were measured: number of fixations, duration of fixation, dwell time in relevant areas, and revisits in relevant areas. Moreover, the scan paths were analysed. Significant differences between the expertise groups were found regarding the locations of the fixations. The differences within the groups were significantly smaller than the differences between the groups. Moreover, the more experienced a person was, the more areas were attended. Thus it seems that the group of experts (sculptors) applied a more global scanning strategy than the less experienced participants. However, this finding might also be due to the differences in total viewing duration. Although significant expertise-related differences in the

eye-movements were found, not all our hypotheses about differential spatial perception were confirmed. In future research, operationalization, methods, and measures in three-dimensional settings have to be further developed. At the conference, we will critically discuss our findings and describe the lessons learned.

Views of Professional Conductors on Practice

Content analysis,Comprehension of text and graphics,Arts ,Workplace learning

Hans Gruber, University of Regensburg, Germany; Helen Jossberger, University of Regensburg, Germany; Martin Ritter, Universtiy of Regensburg, Germany; Birgit Eiglsperger, Department of Art Education, University of Regensburg, Germany , Germany;

In creative domains such as music, extraordinary performance is often associated with giftedness. Conductors particularly fascinate the audience and are viewed as talented maestros. In contrary to the talent view, research on expertise defines the level of performance in terms of the amount of structured practice. We present an explorative case study, in which practice activities of conductors were examined to gain insights into the development of professional expertise. Twelve male professional conductors (age: M=51.75 years; SD=16.30 years) from different nations participated. Qualitative semi-structured interviews were conducted to gather information about musical biography, performance, practice strategies and activities. Content analysis was used to analyse conductorsí professional practice. The results show that the participants experienced musical expertise to be the basic prerequisite for professional conducting. Activities related to score-study ñ mostly rehearsals ñ were described as structured activities that ensured an efficient progress of performance. We classified score-study as deliberate practice as it focussed on performance improvement and required disciplined, persistent and goal-oriented training sessions. Piano-playing, the use of audio recordings or metronome were uncommon in score studying at expert level. The findings also indicate that complex practical and theoretical skills have to be trained through deliberate practice, comparable to instrumentalists, while the approaches might differ. Investigating practice activities in a creative domain like conducting will help us to better understand the important factors involved in the professional development. Professional working-life offers facilitating conditions but demands systematic preparation through deliberate practice.

The development of improvisational expertise in music

Content analysis,Qualitative methods,Arts ,Lifelong learning

Iwan Wopereis, Open University of the Netherlands, Netherlands; Saskia Brand-Gruwel, Open University, Netherlands; Els Boshuizen, Open University, Netherlands;

Improvisation is a complex musical skill that takes many years of practice to master. An interesting question is what it takes to start and maintain such long period of practice and which environmental factors influence commitment to practice. This study aims to reveal factors that affect successful and less successful improvisational skill development. The study compared improvisational skill development of a group of six elite musical improvisers to a group of five

semi-elite musical improvisers by means of a multiple site, structured case study design. A biographical research method was used to collect data for cross case analyses. Data were analysed using a combination of a theory-based categorization system and open coding searching for actors and factors that affected vicious and virtuous cycles of learning. Findings on learning during pre-conservatory, conservatory, and post-conservatory phases revealed group differences in intensity and quality of individual practice, group practice (e.g., participation in jam sessions), network activities that create further opportunities for development and work, as well as individual, self-directed efforts and strategies after developing a personal voice. Theoretically the study provides insight into differences in trajectories of identity development, as well as the development of skills that include timing, interactivity, and risk-taking. Educationally, the study helps to understand learning processes that can hardly be planned and entail hazardous transitions.

J 17

28 August 2015 08:45 - 10:15

Room Yellow_G4

Symposium

Higher education

The reflexive academic: negotiating, mediating, balancing teaching and research in academic careers

Keywords: Higher education,Qualitative methods,Researcher education

Sig's: SIG 24 - Researcher Education and Careers

Chairperson: Angela Brew, Macquarie University, Australia

Organiser: David Boud, University of Technology, Sydney, Australia

Organiser: Lisa Lucas, University of Bristol, United Kingdom

Discussant: Janice Malcolm, University of Kent, United Kingdom

This Symposium aims to elucidate academics' reflexive responses as they seek new ways to fulfil their academic roles and develop new identities within the uncertain and challenging environment within which universities operate. There is a crisis of confidence: the teaching and research academic is under threat. Academics don't always respond to policies that are designed to achieve certain institutional missions, and there is a lack of research evidence to tell universities how academics function in this context. The Symposium demonstrates how academics construct their work and identities as they draw new boundaries between teaching, research and external engagement to meet often conflicting ends. The Symposium includes

qualitative research with academics in six countries. While each paper draws on different conceptual resources, e.g. Archer's modes of reflexivity, Adam's temporal approach, disciplinary identities and symbolic boundaries and a nested contexts perspective, they each see academic career-building as a dynamic process of navigation, through which individual desires and objectives are continually adjusted and re-shaped in the light of particular circumstances. These include personal relationships and responsibilities outside the university as well as structural and temporal constraints within it. The Symposium discusses how academics autonomously navigate structural and agentic constraints and enablers as they perceive them, making up their careers as they go along. It highlights the resilience with which academics attempt to fulfill competing demands and how they cross structural boundaries (including disciplines and time) in order to achieve a coherent sense of identity.

Responding to university policy: The role of reflexivity in the mid-career academic

Qualitative methods,Researcher education,Synergies between learning, teaching and research,Higher education

Angela Brew, Macquarie University, Australia; David Boud, University of Technology, Sydney, Australia; Lisa Lucas, University of Bristol, United Kingdom; Karin Crawford, The University of Lincoln, United Kingdom;

This paper explores how mid-career academics make sense of the competing pressures of teaching, research and administration, and how they reflexively act to construct identities that meet their personal objectives while responding to institutional requirements. It is based on a study of academics in different disciplines, different research-intensive university environments and two different countries (England and Australia). Interviews were conducted with 27 mid-career academics (those 5-10 years beyond their PhD) to explore a) academicsí perceptions of the competing pressures of research, teaching and administration and b) how they develop academic identities that fulfil their personal objectives while at the same time meeting institutional expectations. Data were analysed iteratively around broadly identified themes. It was found that that academicsí modes of reflexivity appeared to be crucially important to how they perceived and acted upon constraints and opportunities for development and to the identities they were constructing. The paper will illuminate academicsí modes of reflexivity and suggest that individualsí responses to university policies may be also, at least in part, based upon the modes of reflexivity that they employ, since these constitute for individuals what they consider is possible or desirable within their context

Temporal navigation in academic work

Qualitative methods,Synergies between learning, teaching and research,Reflection,Higher education

Oili-Helena Ylijoki, University of Tampere, Finland;

This paper explores academic work from a temporal perspective. Grounded on the thesis of social acceleration, the paper argues that the timeframe, timing, tempo and temporality in

academic teaching and research have undergone changes, resulting in the domination of externally imposed, coercive, fast and short-term time which is called ìscheduled timeî. From this starting point, the paper investigates what kinds of temporal conflicts the dominance of scheduled time produces and how academics respond to them in their daily work. The study is based on in-depth interviews with 15 academics and three focus group discussions with altogether 12 participants. All interviewees were social scientists working in research-intensive universities in Finland. The study discerns four core temporal conflicts which characterise academicsí work experiences: 1) scheduled time vs. body time, 2) scheduled time vs. timeless time, 3) scheduled time vs. career time, and 4) scheduled time vs. family time. These conflicts shape and shake academic practices and experiences of teaching and research. However, academics are not victims but active actors who respond to the demands of scheduled time in diverse ways. Hence, the paper focuses on scrutinising how academics navigate amid the temporal conflicts, and craft personally fitting ways to live and work under the dominance of scheduled time. The paper aims to increase awareness of the complexity of time, which may offer insights for further research and inspire possibilities for creating empowering temporal alternatives in academic teaching and research.

Boundary work of bioengineers: Inside the world of academic entrepreneurs

Qualitative methods,Researcher education,Reflection,Higher education

Liudvika Leisyte, TU Dortmund University, Germany;

The literature on disciplinary academic identities shows that discipline as a source of identity seems to retain its dominance despite the changing management practices and working conditions of universities. It seems that academics do not completely embrace the values stemming from organizational management and the demoralization of academic identity may be slightly overstated. Building on Leisyteís (2013) typology of changing sources of academic identities, as well as the literature on symbolic boundaries (Lamont and Molnar, 2002) we aim to understand how bioengineers maintain or disrupt their academic moral framework while responding to the pressure to adopt entrepreneurial roles from their institutional environment. How do they incorporate the entrepreneurial roles along their traditional academic roles and what does this mean for their academic identities? We do so by studying bioengineers in research universities in two national contexts: the US and the Netherlands. The study includes document, website as well as CV analysis together with 10 semi-structured interviews with bioengineers and 4 managers carried out in 2009/12. The findings show that the studied bioengineers uphold high disciplinary values and easily permeate the university and industry boundaries. The findings support the argument of blurring boundaries between academic enterprise and university as organization on the one hand, and blurring boundaries between university and industry, especially when it comes to boundary spanning behaviours of studied bioengineers.

The challenges of entering ëmid-careerí

Qualitative methods,Researcher education,Synergies between learning, teaching and research,Higher education

Lynn McAlpine, University of Oxford, United Kingdom; Cheryl Amundsen, Simon Fraser University, Canada;

This paper explores the implications emerging from an eight-year longitudinal qualitative research program into early career researcher (ECR) experience in which participants were recruited in both Canada and the UK. We used a narrative approach to examine the career trajectories of 19 social scientists and scientists who had five or more yearsí experience after PhD graduation and could be characterized as entering mid-career. The specific questions asked were: a) How do these individuals describe their academic journey to this point? b) What do they imagine for their lives, professionally and personally, in 5 yearsí time? The data were analyzed in order to understand how these individuals navigated their academic work and developed identities in the context of institutional, disciplinary and other pressures. Of the 19 individuals, three not hold teaching-only, five research-only and 11 teaching-research positions. Their descriptions of their pasts and imagined futures suggest that though others might characterize them as mid-career, individuals ñ aside from the teaching-only participants ñ perceived themselves as still striving towards their post-PhD goal of independence as a researcher as represented in a) gaining permanence and b) feeling more established in their field.

J 18

28 August 2015 08:45 - 10:15

Room Green_A6

Symposium

Learning disabilities and special education

Individual differences in dyslexia and its manifestation across languages

Keywords: Learning and developmental difficulties,Learning disabilities,Special education,Writing/Literacy

Sig's: SIG 12 - Writing

Chairperson: Barbara Arfe, University of Padova, Italy

Organiser: Barbara Arfe, University of Padova, Italy

Discussant: Rui Alexandre Alves, University of Porto, Portugal

Clinical labels such as dyslexia often mask wide individual differences in the kind of reading and writing problems that children experience. The manifestation and incidence of dyslexia also varies across languages (and educational systems), reflecting the relative complexity of the writing systems, assessment procedures, and national policies (Arf??, Dockrell, & Berninger, 2014). Despite the number of studies published on dyslexia, the interaction of language specific

and individual factors in dyslexia has been largely neglected to date. The symposium will consider the language specific and individual factors that characterize the expression of dyslexia across writing (and educational) systems. Its aim is to offer an overview of individual differences in the reading/writing problems associated with dyslexia across three language systems, which vary in terms of the transparency of their orthography: Italian, English and Dutch. Four papers will be presented, which, on the basis of developmental and correlational data, address the existing clinical classifications and distinction between dyslexia and dysorthographic disorders (Bigozzi, Tarchi, Caudek, & Pinto), dyslexia and handwriting disorders (Arf??, Corato, Pizzoccaro, Merella; Sumner, Connelly & Barnett; Van Vreckem & Desoete), and the association between dyslexia and problems in reading comprehension (Van Vreckem & Desoete) and between dyslexia and problems of written expression (Sumner, Connelly & Barnett). Implications for assessment and instructional intervention will be discussed.

Children with reading or spelling disorders: Do they share the same predictive patterns?

Quantitative methods,Special education,Learning and developmental difficulties,Writing/Literacy,Primary education

Christian Tarchi, University of Florence, Italy; Lucia Bigozzi, University of Florence, Italy; Corrado Caudek, University of Florence, Italy; Giuliana Pinto, University of Florence, Italy;

This prospective cohort study explored the development of reading and spelling disorders. Dyslexic students (reading disorder), dysorthographic students (spelling disorder), and normally-reading and -spelling students were individuated in third grade, and their emergent literacy and cognitive-linguistic performances in kindergartner were retrospectively compared. Four hundred and fifty Italian children participated in this study. This cohort was followed from the last year of kindergartner to third grade. In kindergartner, children were assessed in phonological awareness, conceptual knowledge of writing system, textual competence, and cognitive-linguistic skills. In third grade, 18 dyslexic children and 13 dysorthographic children were individuated from local diagnostic centers. Overall, the conceptual knowledge of the writing system was the only statistically significant predictor between the clinical samples and the normal population, but no differences were found between dyslexic and dysorthographic students.

The relationship between handwriting and spelling difficulties in Italian children with dyslexia

Quantitative methods,Learning and developmental difficulties,Learning disabilities,Literacy,Writing/Literacy

Barbara Arfe, University of Padova, Italy; Francesca Corato, University of Padova, Italy; Eleonora Pizzoccaro, ASL 20- Verona, Italy; Anne Merella, ASL 20- Verona, Italy;

Handwriting disorders are estimated between 10 to 30% in the school-age population (Feder & Majnemer, 2007). However, in children with dyslexia, the incidence of handwriting difficulties may be even higher (Berninger, Nielsen, Abbott, Wijsman, & Raskind, 2008; Sumner, Connelly & Barnett, 2014). In this paper we try to explore the relationship between spelling and

handwriting problems by examining the spelling and word copying skills of a group of Italian children with dyslexia and handwriting difficulties. Twenty-six children with dyslexia (D) and handwriting problems (age 8-10) participated in this study. The children were asked to write under dictation and copy in manuscript and cursive letters two lists of words: One of orthographically complex words (i.e. with context dependent transcription rules), one of orthographically simple words (i.e. one-to-one phoneme-grapheme correspondences). The performance of the D group was compared to that of a chronologically age (CA) matched group (n=28, age 8-10) and a group of younger children (age 7) matched to the D group for their handwriting skills (HA: handwriting age group). Although the D group showed a significant delay in comparison to the CA group both in spelling and handwriting skills, they seemed to be less affected than the two control groups by the visuo-motor characteristics of the copy task: i.e. cursive or manuscript letters copying. Orthographic complexity influenced the handwriting performance of all groups. The data suggest that the handwriting difficulties associated to dyslexia are related to problems in spelling more than in visuo-motor integration processes.

Individual differences in children with dyslexia in reading comprehension and spelling skills

Special education, Learning and developmental difficulties,Learning disabilities,Literacy

Christel Van Vreckem, University College Arteveldehogeschool, Belgium; Annemie Desoete, University college Arteveldehogeschool Ghent , Belgium;

Group results on reading comprehension and spelling in children with dyslexia often mask individual differences. In this paper, we present the results of two studies dealing with this topic. In the first study 34 children from grade 4 to grade 6 participated. Children with dyslexia (n=17) were compared with age, gender and school matched peers (n=17) on reading comprehension tasks. Although there were significant group differences between the dyslectic and the control group on reading comprehension and on the reading comprehension strategy ëinferencing on text levelí, inter-individual differences were obvious. Some children with dyslexia had e.g. good results on inferencing on text level (pc. 76-100; n= 2), while others had very weak results on the same strategy (pc.10 or less; n=2). In the second study 60 children with dyslexia from grade 2 to grade 6 participated. In this study we found inter-individual differences in the appearance of the disorder (isolated dyslexia versus co-morbid dyslexia) . In addition, most of the children (n=56) had besides reading problems also spelling problems, but the differences in the spelling profile of these children were obvious. Some had problems with spelling existing words and pseudo words (< pc.10), while others only failed on spelling existing words, but not on pseudo words. Teachers and therapists working with children with dyslexia should be aware of these differences and should adapt their approach on these individual needs in the classroom.

Links between spelling, pausing and vocabulary choice in children with dyslexia

Learning and developmental difficulties, Learning disabilities,Literacy,Writing/Literacy

Vince Connelly, Oxford Brookes University, United Kingdom; Emma Sumner, University of London, United Kingdom; Anna Barnett, Oxford Brookes University, United Kingdom;

Spelling is a prerequisite to expressing vocabulary in writing. Research has shown that children with dyslexia are hesitant spellers who pause often when composing. This study aimed to determine whether the hesitant spelling of children with dyslexia, evidenced by frequent pausing, was associated with vocabulary choices when writing. Thirty-one children with dyslexia, mean age 9 years, were compared to typically-developing groups: the first matched by age, the second by spelling ability. Oral vocabulary was measured and children completed both a written and verbal compositional task. Lexical diversity comparisons were made across written and verbal compositions to highlight the constraint of having to select and spell words. A digital writing tablet recorded the writing. Children with dyslexia and the spelling-ability group made a high proportion of spelling errors and within-word pauses, and had a lower lexical diversity within their written compositions compared to their verbal compositions. The age-matched peers demonstrated the opposite pattern. Spelling ability and pausing predicted 53% of the variance in written lexical diversity of children with dyslexia, demonstrating the link between spelling and vocabulary when writing. Oral language skills had no effect. Lexical diversity correlated with written and verbal text quality for all groups. Practical implications are discussed and related to writing models.

J 19

28 August 2015 08:45 - 10:15

Room Brown_B7

Symposium

Self-efficacy

Investigating Social-cognitive Determinants of students' academic performance

Keywords: Achievement, Attitudes and beliefs,Motivation and emotion,Self-efficacy,Self-regulation

Sig's: SIG 8 - Motivation and Emotion

Chairperson: Miriam Marleen Gebauer , TU Dortmund University , Germany

Organiser: Nele McElvany, TU Dortmund University, Germany

Organiser: Olaf Koeller, Leibniz Institute for Science and Mathematics Education, Germany

Discussant: Jan Retelsdorf, Leibniz Institute for Science and Mathematics Education (IPN), Germany

Predicting academic self-efficacy by its sources in different socialization contexts

Attitudes and beliefs,Self-efficacy,Self-regulation,Motivation and emotion

Miriam Marleen Gebauer , TU Dortmund University , Germany; Nele McElvany, TU Dortmund University, Germany; Hanna Ferdinand, TU Dortmund University, Germany; Thorben Huelmann, TU Dortmund University , Germany; Wilfried Bos, TU Dortmund University , Germany; Olaf Koeller, Leibniz Institute for Science and Mathematics Education, Germany; Christian Schoeber, Leibniz Institute of Science and Mathematics Education (IPN), Germany;

Aim of this paper is to investigate the predictive relationship between four sources of self-efficacy and academic self-efficacy of seventh grade students (N = 1,598) in Germany by differentiating the four sources - mastery experience, vicarious experience, verbal and social persuasion and physiological state, within three socialization contexts ñ family, peers and school. Results of structure equation models (SEM) show high factor loadings and substantial predictive power from mastery experience in the socialization context peers on academic self-efficacy (? = .15; p > .01) and between verbal/social persuasion in the context school and academic self-efficacy (? = .28 p > .01) and family (? = .27; p > .01) on measurement time point (t1). Predictive power of verbal/social persuasion on academic self-efficacy can be detected in school context (? = .15; p > .01) on measurement time point 2 (t2). Change from t1 to t2 shows lower effects, e.g. (? = .15; p > .01) .Despite theoretical postulates mastery experience is a strong but not the strongest predictor of academic self-efficacy in all observed contexts. Vicarious experience did not show any significant relation to academic self-efficacy in any socialization context.

Improving Studentsí Self-Efficacy: The Role of Teacher Feedback

Teaching/instruction,Attitudes and beliefs,Self-efficacy,Self-regulation,Motivation and emotion

Christian Schoeber, Leibniz Institute of Science and Mathematics Education (IPN), Germany; Olaf Koeller, Leibniz Institute for Science and Mathematics Education, Germany; Nele McElvany, TU Dortmund University, Germany; Hanna Ferdinand, TU Dortmund University, Germany; Miriam Marleen Gebauer , TU Dortmund University , Germany; Wilfried Bos, TU Dortmund University, Germany; Thorben Huelmann, TU Dortmund University, Germany;

Studentsí domain specific self-efficacy is a powerful predictor of studentsí achievement. In this study we investigated if teachersí individual reference norm orientation as a classroom climate effect has an effect on the development of studentsí self-efficacy in the domains of reading and mathematics. We assessed studentsí domain specific self-efficacy and reading and mathematics achievement from N=1,355 seventh graders at the beginning and at the end of their school year. Teachersí reference norm orientation was rated by the studentsí at the end of grade seven. Controlling for prior achievement and self-efficacy as well as for school-type we found that teachersí individual reference norm orientation has a positive effect on the development of studentsí mathematics self-efficacy (effect size = 0.234, SE = 0.073, p = .01) but has no effect on the development of studentsí reading self-efficacy.

Antecedents and consequences of self-efficacy

Attitudes and beliefs,Goal orientation,Self-efficacy,Self-regulation,Motivation and emotion

Age Diseth, University of Bergen , Norway;

The role of autonomy support and achievement goals, and academic achievement Self-efficacy is considered to be an important motivational factor in educational contexts. It is developed from external experiences and self-perception, and determines the outcome of many events. Current research has related self-efficacy to several motivational constructs, including support of basic psychological needs and achievement goals. This presentation will review findings regarding the role of basic psychological need support (autonomy support), achievement goals, and academic achievement as antecedents and consequences of self-efficacy, thus uniting self-efficacy theory with self-determination theory (SDT) and achievement goal theory (AGT). A main antecedent of self-efficacy is previous mastery experience, including preceding academic achievement. Because self-efficacy is developed from external experiences, autonomy support may be an important aspect of such external experiences, as observed in previous research findings (Diseth, Danielsen, & Samdal, 2012). Regarding consequences of self-efficacy, previous research has assumed self-efficacy to be a general motivating factor which may predict the adoption of particular goals in the learning context (Elliot & Church, 1999). In support of this assumption, previous academic achievement has been found to be a predictor of self-efficacy, but not of achievement goals, whereas achievement goals mediate the relation between self-efficacy and subsequent academic achievement (Diseth, 2011). Taken together, self-efficacy may be considered to be a mediator between preceding achievement and autonomy support on the one hand and achievement goals and subsequent performance on the other. Consequently, students should be given both personal mastery experiences and autonomy support as means of increasing self-efficacy. This may ultimately result in the adoption of approach rather than avoidance goals, and improved academic achievement as a final outcome.

Not stupid, but lazy? How disruptive classroom behavior evokes self-serving attributions for failure

Attitudes and beliefs,Self-efficacy,Self-regulation,Motivation and emotion

Anke Heyder, Freie Universitat Berlin, Germany; Ursula Kessels, FU Berlin, Germany;

Disruptive behavior has many negative outcomes, from students getting poor grades to heightening teachersí stress level. Nevertheless, students display disruptive behavior. Our study examines psychological reasons to show disruptive behavior from an attributional perspective (e.g. Heckhausen, 1972; Weiner, 1994; 1995). We assume that showing disruptive behavior in class is an effective strategy that students can use to elicit self-serving attributions for failure. Attributing failure to lack of effort is self-serving, while attributing failure to lack of aptitude reduces self-esteem. Also othersí reactions to failure vary according to the perceived cause: Perceived lack of effort elicits anger and leads to reprimand, while perceived lack of aptitude elicits sympathy and withholding of reprimand (Weiner, 1995). Butler (1994) showed that students can decipher from a teacherís reaction (reprimanding or not) whether the teacher attributes a studentís failure to lack of effort or aptitude. We assume that failing students use their knowledge about this mechanism in order to elicit reprimands and thus also self-serving attributions. An experimental vignette study with a sample of German ninth-graders tested if students attribute poor performance shown by a disruptive, reprimanded student to lack of effort (and not to lack of aptitude) compared to a similarly poor performance of an unobtrusive student. Also effects regarding ascribed popularity and masculinity were expected. Findings are in

support of our hypotheses, revealing the psychological benefits that students gain from disruptive behavior, especially if they are low-achieving and boys. Results are discussed against the current discourse on boysí academic underachievement.

J 20

28 August 2015 08:45 - 10:15

Room Yellow_G5

Symposium

Teacher professional development

Lesson Study and Teacher Learning: How are they related?

Keywords: In-service teacher education,Learning approaches,Teacher professional development,Workplace learning

Sig's: SIG 11 - Teaching and Teacher Education

Chairperson: Paul Warwick, University of Cambridge, United Kingdom

Organiser: Jan Vermunt, University of Cambridge, United Kingdom

Organiser: Peter Dudley, University of Leicester , United Kingdom

Discussant: Peter Dudley, University of Leicester , United Kingdom

Lesson Study is a pedagogical model for teacher professional learning and development originated in a bottom-up way in Japan. A characteristic feature is a strong focus on teachers analyzing and improving students' learning. The model is rapidly increasing in popularity and it seems to have many features that have been identified as conditional for effective teacher professional development. However, the model has grown from educational practice and to date there is little understanding as to how teachers learn in Lesson Study (LS) and how LS connects to major theories of teacher learning. Moreover, it is not clear to what extent the LS model is embedded within Japanese culture and to what extent the model can be exported successfully to other countries and, for instance more individualistic, cultures. This symposium brings together four studies on teacher learning in Lesson Study with a twofold aim: (1) exploring how Lesson Study affects teacher learning and development, and (2) exploring how Lesson Study is experienced and appreciated by teachers in different cultures outside of Japan. The studies were conducted in two Northern European countries (Ireland, United Kingdom) and two Southern European Countries (Spain, Cyprus). A mixture of qualitative and quantitative methodologies was used by the different researchers to gain understanding of teacher learning and LS and their interrelationships. Moreover, the studies illuminate the role of LS in teachers' development of

pedagogical content knowledge and practical knowledge, teachers' discourse, the creation of professional learning communities, and teachers' patterns of professional learning.

Practical Knowledge and its Implications for In-service Teacher Training: A Lesson Study Experience

Case studies,In-service teacher education,Teacher professional development,Learning approaches

Noemi Pena Trapero, Universidad de Malaga, Spain; Encarna Soto Gomez, Universidad de Malaga, Spain; Maria Jose Servan Nunez, Universidad de Malaga, Spain; Ana Fatima Becerra Mena, Universidad de Malaga, Spain; Kena Vasquez Suarez, Universidad de Malaga, Spain; Sergio Garcia de Paz, Universidad de Malaga, Spain; Jose Antonio Rodriguez Rivera, Universidad de Malaga, Spain; Angel Ignacio Perez Gomez, Universidad de Malaga, Spain;

This paper shows the initial results obtained in research carried out in Spain on the promising relationship between the processes generated by Lesson Study ña powerful methodological tool for autonomous and cooperative identification, comparison and review of espoused theories and theories-in-useñ and the development of practical thinking in in-service teacher training. To this end we focus on monitoring seven infant school teachers both individually and as a group as they take part in this pioneering ongoing training process based on the Lesson Study methodology. We reached the conclusion that this form of training, with its circumstantial and personal nuances, is a rich proposal for questioning espoused theories and theories in use, and, in consequence, for reconstructing the most unconscious practical knowledge through the visibility and contrast of unconscious dimensions. As a witness, the work concludes with the specific case of a teacher in which it could be seen how initial dispositions (emotions, attitudes and values) influence, as part of practical knowledge, the repercussion of this training experience, with those aspects related to non-conformism, intellectual curiosity and intrinsic motivation being the most favourable for the proposed reconstruction.

Mediation of Teachersí Learning through Talk within a Professional Learning Community in Cyprus

Qualitative methods,In-service teacher education,Teacher professional development,Learning approaches,Workplace learning

Christina Chinas, University of Cambridge, Cyprus;

There is wide interest in how teachersí construct knowledge and understanding in collaborative learning contexts such as Lesson Study. This research addresses the mediation of teachersí learning through talk and other interactions in their groups. I considered the interactive processes through which five groups of teachers from three different schools in Cyprus collaboratively developed and constructed new and critical insights into their classroom practices as a basis for changing those practices. I identified and described the different kinds of teachersí talk used during their joint work in order to explain the way they shared common and new professional knowledge and to present the way they developed their professional learning within their

schools. I used the socio-cultural theory to explain the interactive processes and the conditions involved in teachersí collective work and to describe the way their talk influenced their social capital. I present the types of knowledge that were demonstrated while talking in order to explain how talk facilitated the development of teacher learning. This study can help us to understand how effective collaboration can be more reliably achieved and describe how effective teaching classroom-based practices can arise. Teachers do this inter-thinking in ways which most of us take for granted but which are at the heart of human achievement. Developing a better understanding on how teachers can reach it and use it to combine their intellectual resources has useful and practical outcomes for education.

Developing mathematics teachers' pedagogical content knowledge through iterative lesson study cycles

Case studies,Qualitative methods,Teacher professional development,Workplace learning

Aoibhinn Ni Shuilleabhain, University College Dublin, Ireland;

This research investigates lesson study as a model of professional development for post-primary mathematics teachers in Ireland, particularly in developing teachersí pedagogical content knowledge. Based on two case-study schools, twelve mathematics teachers participated in iterative cycles of lesson study over the duration of one academic year. Qualitative data was generated through audio recordings of all teacher meetings around lesson study and through individual interviews with participating teachers held at multiple stages throughout the research. Based on a theoretical framework of mathematical knowledge for teaching as proposed by Ball, Thames, and Phelps (2008), the development of teachersí pedagogical content knowledge through the phases of planning, conducting, observing, and reflecting on collaborative research lessons was analysed. A detailed thematic analysis of the data resulted in the identification of key features of ëknowledge of content and studentsí and ëknowledge of content and teachingí which were developed through teachersí participation in lesson study. This research contributes to the literature in identifying and fine-graining the features of pedagogical content knowledge which are developed through mathematics teachersí participation in iterative cycles of lesson study.

UK Teachersí Perceptions of Lesson Study and its Effects on Teacher Learning: A survey study

Quantitative methods,In-service teacher education,Teacher professional development,Learning approaches,Workplace learning

Maria Vrikki, University of Cambridge, United Kingdom; Jan Vermunt, University of Cambridge, United Kingdom; Paul Warwick, University of Cambridge, United Kingdom; Neil Mercer, University of Cambridge, United Kingdom;

As Lesson Study (LS) is increasingly acknowledged as an effective model of professional development, the present paper uses LS as a framework to increase our theoretical understanding of teacher learning. The purpose of the present study is twofold: (1) to examine what teachers without LS experience expect from LS and how teachers with LS experience perceive and

appreciate LS, and (2) to examine how teachers with and without LS experience learn in the context of professional development. As part of a larger project on LS, the present paper draws on data from a survey completed by two groups of teachers: Experienced LS Teachers, who have a year's experience of LS; and New LS Teachers, who are about to embark on their first LS cycle. The Likert-scale type survey concerned two main constructs: Teachers' Perceptions of LS and Teacher Learning Processes. In terms of the first purpose, quantitative analyses revealed that UK teachers view LS as an effective model and acknowledge its potential benefits, but are uncertain about its practical implementation. As for the second purpose, Experienced LS Teachers reported learning in a more meaning-oriented way in their professional development, whereas New LS Teachers learned in a more undirected way. Additionally, three underlying dimensions could be identified in the data of each construct. The present paper contributes to the field of LS by exploring its cultural acceptance by UK teachers, while it helps develop our theoretical understanding teacher learning by providing evidence of the effects of LS on teacher learning processes.

J 21

28 August 2015 08:45 - 10:15

Room Brown_B8

Symposium

Teacher professional development

Teaching for learning to argue: Approaches in teacher education and professional development

Keywords: Argumentation,Pre-service teacher education,Reasoning,Teacher professional development,Video analysis

Sig's: SIG 11 - Teaching and Teacher Education

Chairperson: Alexander Groeschner, Technische Universitat Munchen (TUM), Germany

Organiser: Alexander Groeschner, Technische Universitat Munchen (TUM), Germany

Organiser: Johannes Bauer, TU Munchen, Germany

Discussant: Hilda Borko, Stanford University, United States

Aims. Argumentation skills of students are a core competence. Research in the fields of teacher education (TE) and professional development (PD) shows that for teaching argumentation skills in schools, teachers themselves need knowledge and skills to argue. The aim of the symposium is to strengthen theoretical and empirical research on argumentation skills in TE and PD. The four studies present approaches to foster argumentation skills from elementary and secondary TE as

well as from PD. Study 1 provides a theoretical framework on teachers' knowledge about cognitive and metacognitive aspects of higher order thinking and learning. The presentation focuses on the feasibility and challenges of argumentation skills for TE and PD. The next three studies are empirical: In study 2, an intervention is presented fostering argumentation skills in pre-service TE by particularly enhancing competencies by working collaboratively on heuristics about appraising evidence and using it argumentatively. In study 3, a new instrument is presented assessing the outcomes of a PD program that sought to build elementary teachers' capability to support their students' capability to engage in argument from evidence. In study 4, effects of a video-based intervention are presented, in which teachers were facilitated to change their classroom discourse to engage students in elaborating and reasoning processes. Scientific and educational relevance. Learning to argue requires teachers who are able to teach argumentation skills. This symposium contributes to a growing body of evidence-based knowledge about fostering argumentation skills.

A (meta)cognitive framework of teachers' knowledge for PD in the field of argumentation

Pre-service teacher education,Teacher professional development,Argumentation,Metacognition,Knowledge creation

Anat Zohar, Hebrew University, Israel;

The proposed framework for teachers' knowledge in the context of argumentation in science classrooms consists of: (a) "knowledge of argumentation" (which has both cognitive and metacognitive aspects, and both domain-general and domain-specific aspects); and, (b) "pedagogical knowledge of argumentation". On the cognitive level, teachers' knowledge of argumentation refers to their ability to construct and critique arguments. The pertinent metacognitive knowledge refers to metacognitive knowledge and skills. The most relevant components of metacognitive knowledge are meta-strategic knowledge (MSK), and knowledge of persons. Epistemological knowledge about the nature of science, and personal epistemological practices are also important. In terms of the pedagogical knowledge of argumentation, the explicitness of MSK as well as the ability to plan, monitor and evaluate cognitive activities in the context of argumentation are crucial elements for several practices such as planning lessons, and applying the "language of thinking". In addition, researchers proposed a number of instructional practices designed specifically to promote a "dialogical classroom". Broader instructional practices and beliefs are also needed to adopt a student-centered approach. The large knowledge base required to teach argumentation creates a mismatch between the scope and complexity of the required knowledge and the duration of typical PD courses, particularly in large scale implementation processes. In light of this mismatch, designers of PD need to ask themselves new questions in order to discover which components of the framework can be taught meaningfully in a limited amount of time in a way that will be most effective for teaching argumentation across numerous classrooms.

Evidence for teachers - Fostering argumentation skills in pre-service teacher education

Qualitative methods,Video analysis,Pre-service teacher education,Argumentation,Competencies,Science education

Sandra Wenglein, Technische Universitat Munchen (TUM), Germany; Johannes Bauer, TU Munchen, Germany; Manfred Prenzel, Technische Universitaet Muenchen, Germany;

Evidence-based argumentation is getting increasingly important in educational policy and practice. However, despite public and policy calls, teachers seem to be insufficiently prepared, both in terms of their knowledge and attitudes, to utilize evidence for their professional reasoning and practice. One reason for this may be that there is no systematic of competences to understand evidence and use it for argumentation in teacher education. To address this problem, we designed a training program for pre-service teachers aiming at fostering these competencies. The training employs collaborative learning to teach heuristics that are helpful for assessing evidence and using it argumentatively. The present study addressed the question to what degree pre-service teachers can be trained to use evidence in a competent way by means of this intervention. Specifically, we were interested in the transfer of the application of the heuristics from the collaborative learning settings (group discussions) during the training to a subsequent test situation in which participants had to evaluate evidence and argue with it individually in written statements on school related problems. For analyzing the use of the heuristics and argumentation quality, we developed a detailed scoring rubric based on competence models of scientific argumentation. The study is currently in progress, results will be able at the conference. First analyses on the scoring rubric showed a good inter-rater reliability (ICC = .95) across all items.

Assessing the Quality of Classroom Discourse in Science Classrooms

Video analysis,Teacher professional development,Argumentation,Science education

Jonathan Osborne, Stanford University, United States; Eric Berson , Stanford University, United States; Hilda Borko, Stanford University, United States; KC Busch, Stanford University, United States; Florencia Gomez Zaccarelli, University of Michigan, United States; Susan Million, Stanford University, United States; Anita Tseng, Stanford University, United States;

This paper presents a new instrument developed for the assessment of classroom discourse in science classrooms. The instrument was developed to assess the outcomes of a professional development program that sought to build 37 elementary teachersí capability to support their studentsí capability to engage in argument from evidence. The theoretical basis of the instrument will be outlined and the procedures used to establish its reliability. Findings based on the rating of a minimum of eight, 15 min segments for each teacher collected over two years will be presented. Broadly these show considerable improvement in facilitating discussion but less in making the discussion epistemically productive. Implications for practice and teacher education will be discussed.

The elements of I-R-F as productive discourse tools: Findings from teacher professional development

Video analysis,Teacher professional development,Social interaction,Secondary education

Ann-Kathrin Pehmer, Technische Universitat Munchen (TUM), Germany; Alexander Groeschner, Technische Universitat Munchen (TUM), Germany; Tina Seidel, Technische Universitat Munchen (TUM), Germany;

The present study investigated whether a one year-long video-based teacher professional development (TPD) program on classroom discourse (intervention group, IG) supports teachers in changing their teaching routines regarding quality of questions (initiation), student elaborations (response) and quality of feedback (follow-up). The newly designed Dialogic Video Cycle (DVC) was based on existing evidence on TPD effectiveness with the aim of supporting teachers in ìteaching for learning to argueî. To contribute to the field of systematic research on TPD effectiveness, IG teachers performance changes were compared to a control group (CG) which took part in a non-video based program with systematic less opportunities for reflection on own teaching routines. In comparison to the CG, results revealed particularly significant changes regarding IG teachersí quality of feedback. Results are backed by qualitative discussion excerpts from the TPD workshops. The study therefore sheds light on which components of the I-R-F are changeable after teacher participation in a video-based program on classroom discourse. The additional discussion excerpts provide insights to further understand why changing teachersí performance in classroom toward enhancing student elaboration and argumentation is a challenging task.

J 22

28 August 2015 08:45 - 10:15

Room Blue2_D2

Symposium

Teacher professional development

Teachersí Collegial Talk and Professional Learning: A View from Four Countries

Keywords: Case studies,In-service teacher education,Informal learning,Social interaction,Teacher professional development

Sig's: SIG 11 - Teaching and Teacher Education

Chairperson: Ilana Horn, Vanderbilt University, United States

Organiser: Ilana Horn, Vanderbilt University, United States

Discussant: Judith Warren Little, University of California, Berkeley, United States

The notion of professional learning communities has captured the interest of educators across the globe as a promising way of supporting teachers' professional learning. Yet what Judith Warren

Little long ago called "the optimistic premise" of teacher community is seldom realized, in part, because we have not yet specified the nature of teacher learning in these settings. The papers in this symposium compare approaches to studying the relationship between teachers' conversations and professional learning to generate more robust understandings of this critical relationship. Reporting on both designed interventions and naturalistic observations, these studies use both qualitative and quantitative methods to analyze teachers' talk. In particular, each study specifies the kinds of interactions that are most consequential for teachers' learning by focusing on different features that shape interaction, including teachers' activity (Paper 1), conceptual focus (Paper 2), representations of practice (Paper 3), and depth of inquiry into practice (Paper 4). Since numerous recent studies highlight the limits of traditional professional development, identifying the relationships between forms of teacher talk and pedagogical learning contributes to the theoretical project of understanding teacher learning processes and the practical goals of instructional improvement and teacher change.

Analyzing Conversational Learning in Various Contexts of Teacher Collaboration

Mixed-method research,Teacher professional development,Developmental processes,Professions and applied sciences,Workplace learning,Cooperative/collaborative learning

Jacobiene Meirink, Leiden University, Netherlands; Rosanne Zwart, Utrecht University, Netherlands; Klaas van Veen, University of Groningen, Netherlands;

This study examines what and how teachers learned during two collaborative learning contexts: 1) reciprocal peer coaching and 2) interdisciplinary teams. Participants included 14 experienced secondary teachers. Researchers mapped the learning processes through detailed descriptions of reported learning activities, reporting learning outcomes, and the relationships between then. Researchers used a variety of qualitative and quantitative methods to select, code, and analyze the sequences of learning activities associated with particular types of learning outcomes. The different activity sequences undertaken by the teachers during the collaborative learning contexts were found to trigger different aspects of their professional development. By relating trajectories of activities to teacher professional learning, this study contributes to our understanding of the productive organization of teacher collaboration.

Teachersí Talk about Learner Thinking in Professional Learning Communities

Qualitative methods,Teacher professional development,Developmental processes,Professions and applied sciences,Workplace learning,Cooperative/collaborative learning

Karin Brodie, Wits University, South Africa;

Professional learning communities are increasingly seen as sites for teachersí professional conversations and learning. In this paper I explore the affordances and constraints of professional conversations among high school mathematics teachers in South Africa, working to try to understand their learnersí mathematical reasoning through learnersí errors and questions on assessments and in class. I describe the development of attunement to learnerís reasoning, a key goal of the project work. A coding scheme is presented, with three main components: Activity,

Content and Depth. These codes allow for an analysis of how different activities that the teachers engage in support different foci and emphases of the conversations at different levels of depth as attunement develops.

Supporting In-School Teacher Leadership, Professional Discourse and Collaboration at Scale

Design based research,Teacher professional development,Developmental processes,Professions and applied sciences,Workplace learning,Learning in context

Orit Parnafes, Ben-Gurion University of the Negev, Israel; Dana Vedder-Weiss, Ben Gurion University of the Negev, Israel; Adam Lefstein, Ben-Gurion University of the Negev, Israel; Yariv Feniger, Ben-Gurion University of the Negev, Israel; Aliza Segal, Ben Gurion University of the Negev, Israel; Christa Asterhan, Hebrew University of Jerusalem, Israel; Mirit Israeli, Ben-Gurion University of the Negev, Israel; Islam Abuasaad, Ben Gurion University of the Negev, Israel; Rotem Trachtenberg, Ben-Gurion University of the Negev, Israel; Miriam Babichenko, Hebrew University of Jerusalem, Israel; Racheli Davies, Ben-Gurion University of the Negev, Israel;

This paper reports on a design-based implementation study aiming to advance our understanding of teacher professional discourse and ways to improve it at scale. The study is part of an ongoing research and development partnership that intervenes on and studies the development of teacher professional leadership and discourse in one large Israeli school district (650 schools). The overall programme integrates 3 components: development, training and research. The development component involves the production of tools and materials for advancing teacher leadership and professional discourse. The training component supports teacher leaders in facilitating professional discourse in their teacher collaborative teams. The research component focuses on teachersí discourse and use of the developed materials in their work groups, and on the challenges in seeking to implement the programme at large scale. The research design includes the documentation of on-going activity in classrooms, in teacher team meetings and in workshops for teacher leaders. In addition, we also conduct teacher interviews and surveys. Analysis of data draws upon and integrates multiple methodological approaches to gain insights and understanding of teacher-led professional discourse and ways to improve it at scale.

Toward a Taxonomy of Instructional Learning Opportunities in Teachersí Collegial Conversations

Conversation/ Discourse analysis,Teacher professional development,Conceptual change,Professions and applied sciences,Workplace learning,Cooperative/collaborative learning

Ilana Horn, Vanderbilt University, United States; Brette Garner, Vanderbilt University, United States;

Not all teacher conversations are equally generative for professional learning. In order to gain traction on what kinds of conversations support learning, this paper presents a grounded analysis of teachersí conversations and the opportunities for learning within them. Building off of

Vygotskyís insights about the relationship between thinking and learning, we examine the potential for concept development in teaching in previously analysed teacher conversations from three projects examining teacher conversations. The taxonomy for conversational learning is presented. This framework contributes to the practical work of support teachersí professional conversations and the theoretical work of understanding the nature of teacher learning.

J 23

28 August 2015 08:45 - 10:15

Room Cyan_F2

Symposium

Self-regulation

Self-regulation and mental effort: Linking cognitive load and judgment of learning research

Keywords: Experimental studies,Instructional design,Metacognition,Multimedia learning,Self-regulation

Sig's: SIG 16 - Metacognition

Chairperson: Anique de Bruin, Maastricht University, Netherlands

Organiser: Anique de Bruin, Maastricht University, Netherlands

Organiser: Jimmie Leppink, Maastricht University, Netherlands

Discussant: Franck Amadieu, University of Toulouse, CLLE , France

In educational science, learners' judgments of their understanding and effort often play a central role. Given that these judgments provide a basis for learning action by aiding learners to determine what to do next (e.g., restudy the material or take a test), they form crucial input for self-regulated learning environments. Interestingly, research on judgments of understanding, often termed Judgment-of-Learning research and research on judgments of effort, or Cognitive Load research show little overlap, even though they often depart from similar research questions. The goal of this symposium is to bring together a number of researchers familiar with one or both of these research disciplines to present work on the interface of JOL and CL and to discuss how bringing them together can provide a novel theoretical ground for research on contemporary issues in educational science. Leppink and colleagues will discuss work on metacognitive judgments in conditional probability problems, where effort and judgment of learning both play a role. Schmeck and colleagues will present work on the timing of CL ratings, a topic that is prominent in JOL research too. Schubert and colleagues will present research on how eye movements can provide input for improving text comprehension, containing both effort and self-

regulation aspects. Finally, De Bruin and colleagues will present a theoretical paper outlining overlap and differences in self-regulated learning and instructional design research, and discussing how combining these approaches can advance research on digitalized education. Franck Amadieu will act as the discussant.

On the accuracy of metacognitive judgments in probability tasks

Experimental studies,Instructional design,Metacognition,Self-regulation,Mathematics,Higher education

Jimmie Leppink, Maastricht University, Netherlands; Ellen Kok , Maastricht University, Netherlands; Mariette van Loon, Maastricht University, Netherlands; Esther Bergman, Maastricht University, Netherlands; Anique de Bruin, Maastricht University, Netherlands;

In an increasing number of domains and contexts, learners are expected to regulate their own learning process. However, the effectiveness of self-regulated learning appears to be based on the premise of accurate metacognitive judgments of learning task performance, task difficulty, mental effort required for task performance, etcetera on the part of the learner. Two mixed-methods studies focused on what cues learners use when making metacognitive judgments and how these cues influence the accuracy of these judgments. The studies focused on probability task performance, because probability is a counterintuitive topic for the vast majority of people. The first study addressed researchers and other professionals who had obtained a masterís or doctoral degree in a social or health domain. The second study focused on university freshmen in psychology. Both studies appear to indicate that people performing conditional probability problems are not really aware of which cues they could use in their judgments of task performance and task difficulty. Further, people who commit errors in performance tend to have an illusion of providing a correct solution to a seemingly ëeasyí problem and overestimate their performance. Moreover, the study focusing on university freshmen indicates that the latter can result in the selection of a subsequent task that is too difficult given the proficiency level of the learner in question.

Itís now or later: Is there an optimal time to measure cognitive load with subjective ratings?

Experimental studies,Assessment methods and tools,Metacognition,Physical Sciences,Multimedia learning

Annett Schmeck, Duisburg-Essen University, Germany; Maria Opfermann, University of Duisburg-Essen, Germany; Detlev Leutner, Duisburg-Essen University, Germany;

The present study aimed at investigating, whether the point of time at which cognitive load is assessed during learning has an impact on the respective scores. In two experiments, students worked through a multimedia lesson on the development of lightning and rated their mental effort and perceived difficulty immediately after each text paragraph as well as once delayed after the whole learning phase. Contrary to prior studies that used problem solving materials and constantly found the delayed scores to be significantly higher than the average of immediate

scores, there were no such differences in the first experiment at all. We even found an opposite pattern of results in the second experiment, where the delayed scores were significantly lower than the average of immediate scores. Thus, although the results partly confirm that there are differences between cognitive load ratings depending on the time at which cognitive load is assessed, the extent and direction of these differences seem to depend on the domain, the learning scenario and participant characteristics. Implications regarding these findings will be discussed at the symposium.

Can Adaptivity based on Studentsí Eye Movements Improve Self-regulation in Multimedia Learning?

Experimental studies,Educational technology,Comprehension of text and graphics,Self-regulation,Science education,Multimedia learning

Carina Schubert, Knowledge Media Research Center, Germany; Katharina Scheiter, Knowledge Media Research Center, Germany; Anne Schueler, Knowledge Media Research Center, Germany;

Despite the general effectiveness of multimedia instruction, there are also students who fail to process verbal and pictorial representations sufficiently. Potentially, these learners are overwhelmed by the demands to monitor and regulate their learning. In the present studies we first investigated whether eye movements would allow for an adequate description of learnersí problems. In Study 1 (N = 29) a cluster analysis revealed three distinct clusters that differed in the degree to which they processed text and pictures as well as integrated both representations as assessed via eye tracking. Moreover, these clusters differed in learning outcomes. Based on these results, we developed a system that provided adaptive processing instructional support based on an online monitoring and analysis of learnersí eye movements. This system was expected to relieve learners from the need to monitor their study behavior and would support them in making more adequate regulation decisions by suggesting to them how to process the information more effectively. In Study 2, 47 students learned with either an adaptive or a non-adaptive multimedia system. The adaptive system registered studentsí eye movements and analyzed them online. As soon as the system registered inadequate processing behavior, an adaptive instructional response was initiated. Results revealed that while there was no overall advantage of the adaptive system for learning, students with low scientific literacy showed better multiple-choice test performance in the adaptive compared with the non-adaptive condition. Implications for the refinement of the system as well as for further research on self-regulated multimedia learning are discussed.

Enhancing self-regulation: Combining self-regulated learning and instructional design research

Experimental studies,Instructional design,Metacognition,Self-regulation,Higher education,Multimedia learning

Anique de Bruin, Maastricht University, Netherlands; Tamara Van Gog, Utrecht University, Netherlands; Fred Paas, Erasmus University Rotterdam/University of Wollongong, Netherlands; Jeroen Van Merrienboer, Maastricht University, Netherlands;

In digitalized education, adequate and effective self-regulation of learning is ever more important given the rapid information increase learners are faced with and taking into account that learners are becoming more and more independent when studying at a distance. In this theoretical paper, we will discuss how bringing together two educational research pillars, that is, instructional design and self-regulated learning, can potentially lay the ground for theory-based research on the issue of development of self-regulation skills in digitalized education. We identify four crucial themes in which these pillars have overlapping and varying approaches that are crucial to tackling this issue: (1) fundamentals of learning and memory as a basis for instruction, (2) the learning tasks and materials they apply to, (3) monitoring of the learning process by the learner, and (4) individualized education. Based on these themes, we will describe how the research pillars can contribute to advance research on the development of self-regulation skills in digitalized education.

J 24

28 August 2015 08:45 - 10:15

Room Blue1_C1

Symposium

Social interaction in L&I

Transforming classroom practices:activity theoretical perspectives on educational tools and contexts

Keywords: Conversation/ Discourse analysis,Learning in context,Qualitative methods

Sig's: SIG 25 - Educational Theory

Chairperson: Cristiano Mattos, University of Sao Paulo, Brazil

Organiser: Demetris Lazarou, Ministry of Education and Culture, Cyprus

Organiser: Andre Rodrigues, University of Sao Paulo, Brazil

Discussant: Annalisa Sannino, University of Helsinki, Finland

The societal needs and demands for schooling are rapidly changing. Such changing conditions require reflexivity and creative responses from schools to be able to close the gap between the practices of conventional schooling and the everyday practices outside of schools. A strong need thus exists for research that addresses educational transformations in schools and the creation of synergy between research and practice to facilitate such transformations. The cultural-historical activity theoretical perspectives of this symposium provide conceptual and methodological tools needed for tackling these challenges. The contributions address both teacher and student perspectives and disclose the complex contextual and tool-mediated nature of classroom

activities. The empirical cases examine the incorporation of new social tools, appropriation of multiple discursive forms, and construction of personal sense in learning practices. The symposium asks: How can activity theory contribute to the understanding and fostering of transformation of teaching/learning practices in school?First, Cunha Junior and van Oers highlight how the teachers make use of Facebook groups, and how the process of using Facebook groups influenced the communication among them. Second, Lazarou reports the various adaptations that teachers made to Toulmin's Argumentation Pattern due to their reflections on their teaching practice. Third, Rajala and Akkerman investigate the possibilities of a dialogical pedagogy approach to personalize space-time grounding of classroom dialogues. Fourth, Rodrigues et al. discuss the relation of Bakhtin's genre in classroom activities and concept formation. After the presentations, Annalisa Sannino will reflect on the studies and open the discussion. Together these studies underline the potential of cultural-historical activity theory to shed light on the transformation of classroom practices.

Teachers and students on Facebook: Working in online groups for transformative learning

Qualitative methods,Educational technology,Student learning,E-learning/ Online learning,Secondary education

Fernando Rezende da Cunha Junior, VU University Amsterdam, Netherlands; Bert van Oers, Vrije Universiteit Amsterdam, Netherlands;

The new communication tools are changing our ways of interacting with others. This is not different in the educational settings, where almost everyone is also connected to each other in a virtual space. Following this trend, the object of this study is to create an online collaborative space, where teachers and students can communicate with each other, share content and discuss what is worked in classroom, by using groups on Facebook. Those groups were formed as a way to fill the technological gap that is present in most of the schools in Brazil, were the schools do not have technological equipment available. In addition, teachers and students used their own technological devices for this study. This study is based on Cultural Historical Activity Theory (Engestrom, 1999; van Oers, 2013; Vygotsky, 1934), which enables us to understand and reconstruct the activities involved in the research. This study is part of a bigger research project and encompasses the work of five teachers with their respective groups of students on Facebook. This is a Transformative Intervention Research (TIR), that is, based on the Critical-Collaborative studies from Magalhaes (2011). All participants are voluntary and are kept anonymous. Our findings suggest that there is an improvement of communication between teacher/students, and an improvement of interest from the students for the topics studied in classroom after the implementation of the groups on Facebook.

Transforming a given tool into a meaningful artefact: Teachers' Reflections on TAP

Qualitative methods,Argumentation,Science education,Primary education

Demetris Lazarou, Ministry of Education and Culture, Cyprus;

Argumentation is considered as a skill that can be developed either by explicitly teaching argumentation or by creating the conditions through which students engage with argumentative discourse. This paper reports on the findings of a project which aimed at promoting argumentation in primary science education. It specifically focuses on reporting the various adaptations that teachers made to Toulminís Argumentation Pattern (Toulmin, 2003) due to their reflections on their teaching practice and how this in its turn, had an influence on their teaching and on studentsí argumentation efforts. The research draws on the theoretical, methodological and analytical underpinnings of Cultural-Historical Activity Theory. It specifically draws from the work of Marx (1973), on the notions of the use and exchange value of commodities, the work of Leontíev (1978), on the process of the objectification of needs, and the work of Engestrom (1987), on the theory of expansive learning. Conclusions and implications for researchers, for teachers and anyone involved in teachersí evaluation will be drawn and presented.

Personalizing space and time of classroom dialogues

Qualitative methods,Video analysis,Teaching/instruction,Social interaction,Learning in context

Antti Rajala, University of Helsinki, Finland; Sanne Akkerman, Utrecht University, Netherlands;

A crucial challenge for schools is to develop learning practices that are personally meaningful to students. In this study, we examined an emerging dialogic pedagogical practice of the first author of this presentation. The aim was to analyze how space and time were personalized in classroom dialogues. The situatedness of sense-making in and across space and time was conceptualized with the notion of chronotope to describe the spatial and temporal organization of the discursive practices of teaching and learning. The data were collected from an inquiry-learning project of an elementary classroom with eighteen third graders and their teacher. The primary data consist of video-recorded classroom dialogues. The data were analyzed with Interaction Analysis of the participantsí talk-in-interaction and significant non-verbal actions. We analyzed teacher chronotoping, that is, chronotopic grounding involved in the teacherís framing and crediting of the studentsí contributions to the joint meaning-making. We also identified episodes of student chronotoping, that is, studentsí attempts at sense-making that involved an initiative to reshape and expand the time-space contexts of the classroom discussions. Our findings show that the teacher began the project with a pedagogical approach that enacted an expansive chronotopic grounding for studentsí sense-making named as a learning journey. We also identified a shift into a more restrictive chronotopic grounding of the classroom dialogues mainly associated with teacher lectures and short triadic dialogues. Nonetheless, we could identify episodes of student chronotoping through which features of the learning journey were momentarily re-evoked by the students.

Multi-determined genres in the educational activity

Qualitative methods,Learning approaches,Problem solving,Science education,Learning in context

Andre Rodrigues, University of Sao Paulo, Brazil; Jose Nami. Ortega., USP -Universidade de Sao Paulo, Brazil; Cristiano Mattos, University of Sao Paulo, Brazil;

The current science education practice is marked by a narrowing of the teaching strategies, frequently test-oriented. Nevertheless, the development of innovative approaches for science teaching involve modeling the verbal and non-verbal interactions in classroom as well as understanding how the utterance is shaped in day-by-day learning activities. In this paper we discuss the effective connections between the Bakhtin's speech genres and the notion of activity as depicted by cultural-historical activity theory. Furthermore, our aim is to look at science learning as an appropriation of a specific genre which makes possible the articulation of many others discursive forms that students crosses in their communicative interactions. Supported by an example of how ninth grade students are intensively engaged in learning angles in a sloping street, we shall shed light in the articulation of genres that has direct implications for theoretical and practical developments for research in education. From the students paths of elaborating and explaining was possible for the teacher to articulate a variety of genres that were used to grasp a complex object. The scientific teaching-learning process is not about finding the correct and unequivocal answer (the truth with capital 'T'); it is the production of a richer and multi-determined utterance. As indicated in the results of our study the appropriation of scientific knowledge and formation of scientific concept is after all the capability to interweave a myriad of way of talking about science.

J 25

28 August 2015 08:45 - 10:15

Room Orange_E1

Symposium

Emotion and affect

Achievement emotions and correlates from primary school to university

Keywords: Higher education,Motivation and emotion,Primary education,Quantitative methods,Secondary education,Student learning

Sig's: SIG 8 - Motivation and Emotion

Chairperson: Daniela Raccanello, University of Verona, Italy

Organiser: Margherita Brondino, University of Verona, Italy

Organiser: Daniela Raccanello, University of Verona, Italy

Discussant: Reinhard Pekrun, Ludwig-Maximilians-Universitat (LMU), Germany

Ubiquity of emotions within learning contexts has recently been mirrored by the increasing amount of research studies focused on them, particularly fostered by Pekrun's control-value theory of achievement emotions (2006). Accordingly, emotions linked to learning activities or

results could be explained by considering the complexity of their relationships with distal and proximal antecedents and outcomes. However, examining current data on how such constructs interact during students' development points to a research gap. This symposium aims to present recent research evidence investigating some of the possible roles played by achievement emotions in a variety of learning settings, involving students from primary school to university.Pnevmatikos and Trikkaliotis test the assumption that triggered emotions of pride and challenge affect second to sixth-graders' inhibitory control, and hence school achievement. Meier and Vogt investigate antecedents, like interest, of six achievement emotions in an activity-oriented out-of- school setting with fourth to sixth-graders. Peixoto, Mata, Monteiro, and Sanches examine correlates of seven classroom and test emotions in terms of mathematics motivation and achievement, involving fifth and seventh-graders. Raccanello, Brondino, and Pasini focus on whether ten achievement emotions moderate the power of cognitive abilities of first-year university students to predict their third-year academic performance.From a theoretical perspective, the four papers contribute to examining in more depth how achievement emotions affect, are affected by, and moderate motivational and cognitive constructs and/or their relationships. Such findings could give applied hints in educational contexts, in terms of acknowledgment of factors interacting with emotions to promote emotionally effective learning environments.

Positive achievement emotions enhance primary school childrenís inhibitory control

Quantitative methods,Student learning,Achievement,Emotion and cognition,Primary education,Motivation and emotion

Iannis Trikkaliotis, University of Western Macedonia, Greece; Dimitris Pnevmatikos, University of Western Macedonia, Greece;

This study examined the functional mechanism of the academic emotions by testing the assumption that positive achievement emotions could affect and enhance childrenís inhibitory control, and hence their academic achievement. Two achievement emotions, namely challenge and pride, were examined in this study. One hundred eighty primary school children of three age groups (second, fourth, and sixth grade) participated in a within-participants experimental study. The number of correct responses in the anti-saccade task in the experimental condition (i.e., participants experienced academic emotions) and in the emotionally neutral control condition served as the dependent measurement of the inhibitory control. Repeated measures analysis of variance showed that, regardless of their age group and the achievement emotion experienced, participants performed significantly better in the anti-saccade task in the experimental condition than in the emotionally neutral control condition. This evidence suggests that the already well established evidence for the impact of the achievement emotions on academic achievement might be mediated by the improvement achievement emotions induce to the inhibitory control.

Task determinants of achievement emotions in an out-of-school setting

Quantitative methods,Student learning,Emotion and affect,Goal orientation,Out-of-school learning,Motivation and emotion

Angelika Meier, University of Teacher Education, Switzerland; Franziska Vogt, Padagogische Hochschule St. Gallen, Switzerland;

This study investigates the antecedents of achievement emotions in an activity-oriented out-of-school setting (learning space, Lernwerkstatt in German). Learning spaces evolve around a core theme, weather and climate for this study. To what extent students need instruction is controversially discussed amongst the teachers involved with learning spaces as well as within educational research. Thus, the extent of guidance is varied in this research project. In addition, effects of individual characteristics on achievement emotions and cross-level interactions between these individual differences and type of task are examined. Three hundred and seventy students from grade four to six visited the learning space for the duration of a half-day. Prior to their visit, achievement goals, interest in science topics, and academic self-concept were assessed. During their visit, students were free to choose from 30 different tasks and to work in small groups or pairs. After completion of a task, students were asked to indicate their achievement emotion (i.e., interest, boredom, happiness, sadness, pleasantness, and anger). There were two types of tasks: problem-oriented with only the problem given and tasks with a step-by-step instruction. Findings suggest that there is no general effect of type of task on achievement emotions. With regard to individual differences, students with a strong interest in science topics report more positive achievement emotions after working on a problem-based task and more negative emotions after working on a task with step-by-step instruction. Implications for the development of tasks that are conducive to positive affective experiences for all students are discussed.

Emotions, motivation and academic achievement in pre-adolescent students

Quantitative methods,Student learning,Emotion and affect,Goal orientation,Secondary education,Motivation and emotion

Francisco Peixoto, ISPA - Instituto Universitario / U.I.P.C.D.E., Portugal; Lourdes Mata , ISPA ñ Instituto Universitario / Research Center in Education ñ ISPA (CIE ñ ISPA), Portugal; Vera Monteiro, Instituto Superior Psicologia Aplicada, Portugal; Cristina Sanches , ISPA ñ Instituto Universitario / Research Center in Education ñ ISPA (CIE ñ ISPA), Portugal;

The main goal of this study is to analyze the relationships between classroom and test emotions with motivation and achievement in mathematics. The participants were 901 students from fifth and seventh grade. They completed two questionnaires, one that measured their mathematics motivation considering four dimensions: Value, Enjoyment, Perceived Choice, and Perceived Competence, and another considering the emotions in two different situations: Classroom and Tests. The classroom version assesses: boredom, hopelessness, anger, anxiety, enjoyment, and pride. The test version assesses the same emotions with relief instead of boredom. Achievement was operationalized through the grades in mathematics at the end of each school term. Results showed significant relationships between emotions, motivation, and academic achievement. The association between achievement emotions and studentsí performance confirms the functional importance of these emotions. Results also showed that emotions in different situations (classroom and test) relate differently with motivation but not with academic achievement.

Cognitive abilities and performance: The moderating role of undergraduatesí achievement emotions

Quantitative methods,Student learning,Achievement,Emotion and cognition,Higher education,Motivation and emotion

Daniela Raccanello, University of Verona, Italy; Margherita Brondino, Department of Philosophy, Education and Psychology, University of Verona, Italy; Margherita Pasini, Department of Philosophy, Education and Psychology, University of Verona, Italy;

A large body of work emphasizes the key role of affect for cognition (Oatley, Parrott, Smith, & Watts, 2011). However, only recently has particular attention been paid to such influence in learning contexts, where emotional interventions could support and enhance studentsí performance (Hascher, 2010; Pekrun, 2009). While there is some experimental evidence showing mood effects in learning settings, more research is needed in light of the documented context-specificity of achievement emotions. Therefore, taking into account the control-value theory of achievement emotions (Pekrun, 2006), we explored whether the expressed intensity of ten achievement emotions experienced by 217 university students during their first year moderated the predictive power of cognitive abilities (logic aptitude, text comprehension) on performance (number of passed exams, mean grade of passed exams) measured three years later. Achievement emotions were assessed with reference to two settingsólearning exam-relevant material and taking an exam. We conducted a path analysis to test whether initial cognitive abilities predicted later academic performance and found that they were positive predictors of the mean grade. Then we explored whether the previous model was moderated by achievement emotions, separately for emotions and settings. We found that the predictive power of cognitive abilities was, with some exceptions, reduced by lower positive emotions and higher negative emotions. Notwithstanding limitations such as the nature of self-report data, our findings encourage the development of intervention programs focused on emotional competence as a way to facilitate academic success and prevent students from dropping out of tertiary studies.

J 26

28 August 2015 08:45 - 10:15

Room Green_A8

Symposium

Early childhood education

The effect of early childhood education to child outcomes

Keywords: Cognitive development,Developmental processes,Early childhood education,Literacy,Mathematics,Meta-analysis

Sig's: SIG 5 - Learning and Development in Early Childhood

Chairperson: Marja-Kristiina Lerkkanen, University of Jyvaskyla, Finland

Organiser: Marja-Kristiina Lerkkanen, University of Jyvaskyla, Finland

Organiser: Paul Leseman, Utrecht University, Netherlands

Discussant: Miriam Leuchter, University of Munster, Germany

Evidence indicates that high process and structural quality of early childhood education and care provisions (ECEC) shapes childrenís later learning and development. Process quality refers to adult-child interaction, guidance and scaffolding, a positive affective classroom climate, and opportunities to learn. In construct, structural quality includes aspects such as group size, rations, and staff competences. Structural quality characteristics are thought to determine child outcomes via process quality. Drawing on recent large-scale longitudinal research conducted in the Netherlands, Germany, Portugal, and Finland, papers in this symposium will present new evidence on the importance of ECEC quality for child outcomes. The first paper reports results from a study in the Netherlands investigating the relation between quality and curriculum of ECEC and two-year-old childrenís growth in attention and language skills. The second paper integrates evidence obtained in German and other European studies on the effects of the quantity and quality of ECEC on young childrenís pre-mathematical development. The third paper presents an overview of several studies from Portugal on the effects of ECEC quality on childrenís academic skills. The final paper reports a study from Finland on the relation between process quality and childrenís literacy outcomes in kindergarten and Grade 1. The discussion will highlight the importance of ECEC quality for child outcomes and will argue why improving the quality of ECEC in classrooms should be a top priority in educational policy. Overall, the papers of the present symposiums extend previous research and suggest that quality should be a priority in ECE across Europe.

Effects of ECEC quality on childrenís attention and language development in the preschool years

Quantitative methods,Developmental processes,Early childhood education,Learning in context

Pauline Slot, Utrecht University, Netherlands; Hanna Mulder, Utrecht University, Netherlands; Josje Verhagen, Utrecht University, Netherlands; Jan Boom, Utrecht University, Netherlands; Annemiek Veen, Kohnstamm Institute, Netherlands; Paul Leseman, Utrecht University, Netherlands;

High quality Early Childhood Education and Care (ECEC) has been linked to positive developmental outcomes for young children. The present longitudinal study (Pre-COOL) examined the relation between quality and curriculum of Dutch preschool and day care centers and childrenís attention and language development between ages two and three. Quality of the centers was assessed using the Classroom Assessment Scoring System when children were two years old. Curriculum was assessed with teachersí self-reports on the provision of different types of activities. Childrenís receptive language development was assessed at age two and three using the Peabody Picture Vocabulary Test, while selective attention was assessed with a computerized

visual search task. Results show that ECEC quality was predictive of childrenís gains in vocabulary and attention. More specifically, Emotional Support was predictive of better language development between age two and three years, while support for learning predicted attention development. The provision of play activities was negatively related to growth in both vocabulary and attention skills, which possibly can be explained by the fact that play in Dutch ECEC settings is mostly unguided play. The findings of the current study show the importance of evaluating ECEC quality as a multi-faceted construct.

Impact of ECEC on Math Development ñ Evidence of German and European Longitudinal Studies

Meta-analysis,Numeracy,Mathematics,Early childhood education,Learning in context

Hannah Ulferts, Freie Universitat Berlin, Germany; Yvonne Anders , Free University Berlin, Germany;

The study aims at evaluating the evidence of the impact of ECEC (early childhood education and care) on childrenís math development. Primary goal is to explore findings for the developmental consequences of quantity and/or quality of ECEC. Additionally, the study evaluates evidence regarding the role of child characteristics (e.g. gender, age) and family background (e.g. socioeconomic status, migration background) in the examination of ECEC effects. The study consists of a comprehensive review of German longitudinal studies and a meta-analysis of European studies. It highlights the variation in study results, ECEC systems, and study characteristics across comparative longitudinal studies in Europe. The value and challenges of conducting meta-analyses in the field of ECEC are discussed.

The effects of early childhood education on childrenís literacy and mathematic skills in Portugal

Quantitative methods,Literacy,Mathematics,Early childhood education,Learning in context

Joana Cadima, University of Porto, Portugal; Ana Gamelas, University of Porto, Portugal; Teresa Leal, University of Porto, Portugal; Isabel M.P. Abreu-Lima, University of Porto, Portugal;

In this paper we present an overview of several studies that have examined the quality of early childhood education (ECE) in Portugal. To illustrate the effects of ECE on childrenís academic skills, we present data of the Context & Transition Study, a longitudinal study that had followed children throughout first grade and present findings examining the extent to which the overall quality of early childhood education quality predicted childrenís literacy and mathematic outcomes at the end of first grade. Participants in this study were 119 six-year-old children who attended 52 preschool classrooms. The quality of early childhood education was assessed using the Early Childhood Environment Rating Scale ñ revised (ECERS-R; Harms, Clifford & Cryer, 1998) and the Literacy and Mathematics Extension (ECERS-E; Sylva, Siraj-Blatchford, & Taggart, 2003). Children were individually assessed in their school settings using direct measures of vocabulary, concepts about print, reading comprehension, arithmetic, counting, and formal mathematics. Findings from this study indicated that high-quality preschool classrooms

were positively associated with most of literacy outcomes and some mathematics outcomes, controlling for childrenís gender, age, and maternal education. Additionally, the quality of the mathematics environment was particularly relevant in the prediction of most mathematics skills. These findings provide further evidence of the importance of providing high-quality ECE to enhance literacy and academic outcomes in all children.

Longitudinal effects of kindergarten quality on the development of literacy skills in Grade 1

Quantitative methods,Developmental processes,Literacy,Early childhood education,Learning in context

Gintautas Silinskas, University of Jyvaskyla, Finland; Anna-Maija Poikkeus, University of Jyvaskyla, Finland; Marja-Kristiina Lerkkanen, University of Jyvaskyla, Finland;

The purpose of the present study was to identify domains and dimensions of classroom quality in kindergarten that are most strongly related to childrenís literacy gains in kindergarten and Grade 1. In addition, we examined the extent to which kindergarten quality domains and dimensions predict child outcomes in Grade 1 after controlling for the previous level of the skill. Classroom quality was assessed using the CLASS (emotional support, instructional support, classroom organization) in 49 kindergarten classrooms. Literacy skills of 514 children (i.e., word reading, reading comprehension) were assessed at the end of kindergarten, and at the beginning and end of Grade 1. The results of SEM analysis showed, first, that the quality of emotional support and classroom organization was most strongly associated with kindergarten-age pre-reading skills: The higher the classroom quality in kindergarten, the better pre-reading skills at the end of the kindergarten year. However, only the quality of emotional support in kindergarten positively predicted childrenís reading skills to Grade 1 after previous level of the skills was controlled for. Identifying domains and dimensions of the quality that are the most strongly related to academic outcomes may help to design and improve professional development programs and classroom practices in early childhood education.

J 27

28 August 2015 08:45 - 10:15

Room Yellow_G1

Symposium

Assessment methods and tools

Leveraging the collaborative nature of peer-feedback with instructional scaffolds

Keywords: Assessment methods and tools,Cooperative/collaborative learning,Experimental studies,Peer interaction,Social aspects of learning

Sig's: SIG 1 - Assessment and Evaluation

Chairperson: Astrid Wichmann, Ruhr University Bochum, Germany

Organiser: Astrid Wichmann, Ruhr University Bochum, Germany

Organiser: Jan-Willem Strijbos, Ludwig-Maximilians-Universitat (LMU), Germany

Discussant: Frans Prins, Utrecht University, Netherlands

Over the past decade research on peer-feedback has shifted from a dominant focus on issues of reliability and validity of peer versus teacher ratings to an increased emphasis on the social nature of peer-feedback. Peer-feedback in essence is a special case of collaborative learning, as learners provide and receive feedback on learning products of peers which holds rich learning opportunities for both the assessor and assessee. However, these moments of interaction also pose challenges for the learner. During peer-feedback, students indirectly "co-respond" to each other (Saunders, 1989) and may differ in their learning goals, domain-specific ability, and their capacity to provide, receive and apply peer-feedback. In line with Strijbos and Sluijsmans' (2010) call, this symposium investigates the collaborative nature of peer-feedback via (quasi-) experimental studies. These studies explore various instructional scaffolds that support the assessor, assessee or both. In addition to learning outcomes, several factors that are relevant for learning are addressed as well, including (1) students' emotions, (2) students' perceptions, (3) peer-feedback uptake, and (4) peer-feedback quality. Combined these four contributions enhance our understanding of the collaborative nature of peer-feedback, and how we can apply instructional scaffolds to leverage students' learning benefits from peer-feedback practices. References: Saunders, W. (1989). Collaborative writing tasks and peer interaction. International Journal of Educational Research, 13, 101ñ112. Strijbos, J.-W. & Sluijsmans, D. M. A. (2010). Unravelling peer assessment: Methodological, functional, and conceptual developments. Learning and Instruction, 20(4), 265ñ269.

The impact of peer-feedback on mathematical reasoning: Role of domain-specific ability and emotions

Experimental studies,Assessment methods and tools,Peer interaction,Mathematics,Higher education,Cooperative/collaborative learning

Maryam Alqassab, Ludwig-Maximilians-Universitat (LMU), Germany; Jan-Willem Strijbos, Ludwig-Maximilians-Universitat (LMU), Germany; Stefan Ufer, Ludwig-Maximilians-Universitat (LMU), Germany;

Studentsí domain-specific ability is a longtime concern in peer-feedback. However, direct effects of domain-specific ability on peer-feedback efficiency have been largely overlooked. Moreover, while some studies reported that students experience anxiety, the role of emotions is still open. Finally, most peer-feedback research within a content domain focused on language learning, whereas studies in mathematics are limited. This study examines the impact of peer-feedback on studentsí mathematical reasoning by considering (a) differences in studentsí domain-specific

ability and (b) experienced emotions. In a quasi-experimental design, mathematics pre-service teachers were involved in two peer-feedback cycles: students worked on a geometry construction task, provided written peer-feedback on the solution of an anonymous peer, reflected on the peer-feedback provision process, revised their work based on the received peer-feedback, and rated how they perceived the peer-feedback. Pairs were based on domain-specific ability-gaps of 0%, 10% and 20%; using absolute scores on a geometry pretest. Epistemic emotions were measured three times during each peer-feedback cycle. A pilot with 15 female mathematics pre-service teachers revealed that several epistemic emotions were experienced: curiosity, frustration, surprise, and confusion. Students who provided feedback to peers 20% higher in ability, compared to their own ability, reported negative emotions about themselves or their work after examining the peersí work. Their 20% higher-ability counterparts attempted to understand their peerís solution and phrase feedback in a considerate manner. Findings from an ongoing data collection with 50 pre-service teachers (finalized in Jan. 2015) will be presented at the conference.

Supporting apprentices in generating peer and internal feedback with a formative assessment script

Experimental studies,Assessment methods and tools,Peer interaction,Professions and applied sciences,Workplace learning,Cooperative/collaborative learning

Olaf Peters, Technische Universitat Dresden, Germany; Marlene Mews, Dresden University of Technology, Germany; Hermann Koerndle, Dresden University of Technology, Germany; Susanne Narciss, University of Passau, Germany;

We aim to extend general findings about the benefits of generating peer feedback for internal feedback processes of the assessor to the field of vocational education, namely apprentice cutting mechanics planning manufacturing processes on CNC machines. Generating feedback can support students in reflecting on strengths and weaknesses of different approaches. Thus generating peer and internal feedback might be helpful for self-revision. Since students might have difficulties in generating adequate peer and internal feedback, a formative assessment script (FAS) was designed to support apprentices in generating formative feedback. It is hypothesized (a) that apprentices can be supported by the FAS in generating peer-feedback and internal feedback and (b) that generating peer-feedback fosters subsequent internal feedback activities. Altogether, 79 apprentices participated in this field study. All subjects produced a manufacturing plan for a metal workpiece. Afterwards students either generated feedback (with vs. without FAS) on a peer plan and subsequently on their own plans or generated feedback on their own plans only (with vs. without FAS). The results of our study indicate clear benefits of the FAS for generating peer and internal feedback. Students did not only generate more peer-feedback and internal feedback with FAS, but perceived their PF as more adequate than without FAS. The benefits of generating peer-feedback for internal feedback processes were found for students without support of FAS but not for students with FAS. Possibly the FAS already provided enough support for detecting potential improvements in studentsí initial plans.

Supporting the assessee to make sense of peer-feedback: Findings from the lab and the field setting

Experimental studies,Assessment methods and tools,Peer interaction,Writing/Literacy,Higher education,Computer-supported collaborative learning

Astrid Wichmann, Ruhr University Bochum, Germany; Moshe Leiba, Holon Insitute of Technology, Israel; Alexandra Funk, Ruhr University Bochum, Germany; Michaela Ronen, Holon Insitute of Technology, Israel; Nikol Rummel, Ruhr University Bochum, Institute of Educational Research, Germany;

Drafting and revising texts is a challenging task for young university students. Peer-feedback can support students in detecting problems and revising their texts accordingly. Yet, often students fail to capitalize on the peer-feedback they receive as they do not take it up. Support is needed to help students in making sense of peer-feedback with the goal to prevent peer-feedback rejection, to increase understanding, and to improve peer-feedback uptake. Two experimental studies, one in a controlled setting (lab) (N=92) and one in a natural setting (field) (N=74) were conducted to explore the impact of sense-making support during peer-feedback reception. Students were asked to draft a text and to revise the text after receiving peer-feedback. In the lab, feedback was given by trained tutors to control for variance of peer-feedback quality whereas in the field, feedback was given in multiple cycles and by real peers. Results from both settings showed that sense-making support was not effective regarding feedback-based revisions but effective in other ways. In the lab, students with sense-making support were more cautious regarding erroneous feedback and made less new errors during revision. In the field, students with sense-making support needed fewer peer-feedback cycles until text was revised. The results from both settings suggest that students reflected more on errors pointed out in the peer-feedback, leading to less new errors and less peer-feedback cycles needed for successful revision. These results add to findings in the field of peer-feedback suggesting that fostering sense-making helps students to manage peer-feedback more effectively.

The impact of varying degrees of scripting on peer-feedback quality and product quality

Experimental studies,Assessment methods and tools,Peer interaction,Writing/Literacy,Higher education,Computer-supported collaborative learning

Mario Gielen, Ghent University, Belgium; Bram De Wever, Ghent University, Belgium;

This research focuses on varying the scripting level over time for the role of both the assessee and the assessor in the peer-feedback process, in which we focus on the impact on peer-feedback quality and product quality in a wiki-based computer-supported collaborative learning environment. First year university students, enrolled in an educational sciences program were asked to collaborate in small groups and give each other feedback on writing assignments in a wiki environment. Two subsequent studies were set up. In the first study (conducted in 2013), the role of assessee and assessor was additionally structured, through a feedback request list and/or a content checklist, which resulted in four conditions. For the second study (conducted in 2014), the only difference was that the additional structure was faded over time. Results of the first study showed that the quality of the peer-feedback and writing product increased for all students over time, when students have multiple practice occasions. Especially when the assessee is required to request for specific peer-feedback, both the quality of the peer-feedback and the

products improve significantly. Additional scripting appears to be a useful strategy in the initial phase, but its effect decreases over time. For the second study, it is hypothesized that students, whoís role as assessor and assessee is rigidly scripted in the initial phase but gradually faded out over time, will have higher peer-feedback quality and higher writing product quality.

J 28

28 August 2015 08:45 - 10:15

Room Yellow_G2

Symposium

Collaborative and cooperative learning

Understanding individual participation to social regulation in collaborative learning

Keywords: Conversation/ Discourse analysis,Cooperative/collaborative learning,Metacognition,Reflection,Social aspects of learning,Video analysis

Sig's: SIG 16 - Metacognition

Chairperson: Simone Volet, Murdoch University, Australia

Organiser: Jean-Luc Gurtner, University of Fribourg, Switzerland

Organiser: Simone Volet, Murdoch University, Australia

Discussant: Allyson Hadwin, University of Victoria, Canada

The important role played by social interaction in the construction of knowledge and the development of individual thinking is widely recognised. How collaboration and interpersonal regulation within a group of students can lead to the co-construction of conceptual understanding, new solutions or improved learning also has received increased attention in recent years. What remains unclear however is how such co-constructions are triggered, sustained or hindered by specific interventions introduced in the collective discourse by one or another member of the group or by specific reactions to another member's input within the conversational process. Furthermore, finding suitable methods to analyse the role of individuals' contributions within a group, given the interactive, relational and evolving nature of the target phenomenon is a challenge. Multiple methods of data analysis and approaches are certainly needed to meet it. Coming from different backgrounds, perspectives, and applied settings, the contributors to this symposium will outline how they have addressed this issue in their work, paying particular attention to the importance of combining different analytical methods for enhanced insight. Each will present how they have conceptualised, identified and analysed individual contributions to collaborative elaboration, negotiation and coordination of a group

solution or discourse. Each will also discuss the potential and limitations of their analytical approach.

What multiple methods tell us about individual contributions in group processes?

Video analysis,Student learning,Peer interaction,Professions and applied sciences,Higher education,Cooperative/collaborative learning

Simone Volet, Murdoch University, Australia; Marja Vauras, University of Turku, Finland; Deep Khosa, University of Guelph, Canada;

The important roles individuals play in interaction with peers in productive collaborative learning remains a challenge in research on collaborative learning. Group-level interaction analyses of highest and lowest performing groups have unveiled distinct, meaningful patterns in focus and depth of engagement in collective, shared cognitive processes but systematic studies of the nature and dynamics of individual contribution within collaborative groups, which differ in quality of their collective outcome, are still scarce. Our empirical study addresses this gap, using a multi-method approach to generate a more holistic portrait of individual impact. Data are video footage of collaborative learning interactions of four small groups of university students as they jointly constructed a concept map of a clinical case. The groups were those that obtained the highest and lowest scores (compared to expertsí maps) for their completed map. Three independent sets of individual-level data analyses focused on the identification and significance for group productive high-level engagement of: 1) productive key roles played by students; 2) functions of individual contributions aimed at regulating the group activity; and 3) patterns in the relational dynamics that constituted the interactions. Combining the findings from each method was critical to achieve (a) a more holistic conceptual understanding of what characterizes the nature and dynamics of individual contributions within more or less successful groups, (b) the extent to which individual participation patterns were similar for successful groups and different from less successful groups, and (c) whether alternative analyses similarly confirmed this hypothesis or not.

The role of the other-regulatorís regulatory focus and quality in collaborative activity

Mixed-method research,Video analysis,Peer interaction,Science education,Secondary education,Inquiry learning

Toni Rogat, Purdue University, United States; Karlyn R. Adams-Wiggins, Rutgers, the State University of New Jersey, United States;

In our research, we have become interested in investigating the role of an individual who other-regulates collaborative group activity (Rogat & Adams-Wiggins, 2014). These research questions have necessitated methodological advances to analyze the role played by a single member within the group. We have had to confront a methodological challenge given that collaboration involves negotiation among multiple coordinating individuals, in fluid and dynamic exchange. Taken together, we describe our efforts to first parse group process into its component individual turns for analysis, before examining the function of these individual turns

in the context of the shared dynamic activity. The data are videotaped observations of small groups of four during inquiry-based science tasks for which elaborated running records were prepared. Initial analytic steps focused on parsing social exchange into individual turns for further interpretation. We coded single speakerís contribution for evidence of social regulation, and then designated sub-codes to classify the types of regulation (e.g., content regulation; group process). In analysis of these single turns, we examined frequency information for evidence of imbalance in regulation among group members as well as the broad versus narrow use of regulation types. Subsequently, we engaged in qualitative analysis of the other-regulators use of regulation to better characterize their focus in regulating the group. We coupled this analysis of individual turns by contextualizing the other-regulator within extended socially shared exchanges. In these instances of collaborative dialogue, our analyses considered the role of the other-regulator in initiating and maintaining socially shared exchanges, relative to efforts at hindering these productive exchanges.

Socially shared regulation of learning when collaboration is inescapable

Mixed-method research,Video analysis,Peer interaction,Professions and applied sciences,Vocational education

Elisa Motta, Swiss FederaInstitute for Vocational Education and Training (SFIVET) , Switzerland; Alberto Cattaneo, Swiss Federal Institute for Vocational Education and Training, Switzerland; Jean-Luc Gurtner, University of Fribourg, Switzerland;

The present contribution is based on a study investigating social regulation of learning in collaborative activities in Vocational Education and Training. 22 chef apprentices were videotaped while performing, in small groups, different problem-solving activities related to their professional learning. The specific aim of this study was to investigate whether the quality of socio-emotional interactions and social regulation mechanisms predicted the quality of groupsí regulations of cognition and performances. All videotapes were transcribed and analyzed. Verbal interactions were coded on the basis of an ad hoc coding-scheme elaborated after Volet, Summers and Thurman (2009) and Rogat and Linnenbrink-Garcia (2011). Frequencies of each code were computed and logistic regressions calculated. Each groupís production was discussed in class at the end of an activity and kept for analysis by the research team. Co-regulation episodes were observed quite often in the 324 episodes coded, with similar proportions of high and of low-content co-regulation episodes. Both, questioning and explaining interventions (Volet et al.) and socio-regulatory processes such as monitoring and planning (Rogat & Linnenbrink-Garcia) were found in high-level content co-regulation episodes significantly more often than in the other types of episodes. However none of the indicators of positive or negative socio-emotional interactions could be linked to the quality of group regulation, neither in terms of level of content nor with respected to the socio-regulatory processes engaged in. The way youngsters interact in a group from a socio-emotional perspective did not seem to influence the groupís quality of work from a cognitive point of view.

Conversation types and their role in social interaction and cognitive development

Mixed-method research,Argumentation,Cognitive development,Peer interaction,Cooperative/collaborative learning

Charis Psaltis, Univeristy of Cyprus, Cyprus;

This presentation is grounded in the Cambridge strand of the third generation of research on social interaction and cognitive development. This line of research extends the work of the social Genevans (Doise & Mugny, 1984; Perret-Clermont, 1980) by introducing social identity dynamics into the study of social interaction and cognitive development. Social Identity dynamics are constrained and enabled by social representations of various asymmetries in the classroom (gender, ethnic identity, popularity, social class). One particular characteristic of this research program is the methodological innovation of identifying a number of conversation types with close links with individual outcomes for the children who interact on cognitive tasks. In this paper these four conversation types and their importance are discussed and illustrated with data showing how the micro level analysis of unfolding communication distinguishes different types of conversation or interaction types.

J 29

28 August 2015 08:45 - 10:15

Room Purple_H4

Symposium

Conceptual change

Changes in teachersí personal epistemologies through explicit reflection and reflexivity

Keywords: Attitudes and beliefs,Conceptual change,Developmental processes,In-service teacher education,Teacher professional development

Sig's: SIG 11 - Teaching and Teacher Education

Chairperson: Florian Feucht, The University of Toledo, United States

Organiser: Florian Feucht, The University of Toledo, United States

Discussant: Jo Lunn Brownlee, Queensland University of Technology (QUT), Australia

This symposium will explore teacher reflexivity for personal epistemology as a new way of thinking about changing personal epistemologies in teaching contexts. Specifically we will discuss a range of ways to promote belief change based on explicit reflection, including reflection in the context of teaching practice and then we will explore a new model for reflection on personal epistemologies which involves reflexive thinking. The symposium presents three

emprical studies conducted in pre- and inservice teaching contexts using qualitataive and quantitataive methods. All three studies include relection and reflexivity as data collection strategy, a teaching strategy/ intervention, and/or as a theoretical framework. The fourth presentation will report on the outcomes of an EARLI Advanced Study Colloquium 2015 entitled "Changing personal epistemologies in teaching and teacher education: a focus on reflection and reflexivity", which will take place immediately before the conference. This presentation will provide a broader context to the symposium by addressing "reflexive thinking" as an extended framework and by identifying research methodologies for personal epistemology in the context of reflection and reflexivity.

Question everything: Exploring intercultural maturity and reflexivity through self-authorship

Case studies,Qualitative methods,Attitudes and beliefs,Culture,Early childhood education,Multicultural education

Julia Mascadri, Queensland University of Technology (QUT), Australia; Jo Lunn Brownlee, Queensland University of Technology (QUT), Australia; Susan Walker, Queensland University of Technology, Australia;

As societies and classrooms around the world continue to diversify, there is a growing need for intercultural understanding and respect for diversity. This qualitative case study draws on King and Baxter Magoldaís (2005) developmental model of intercultural maturity to allow for a holistic exploration of the complexities of intercultural experiences in early childhood educational settings. The intercultural maturity model is a multidimensional developmental framework that integrates research in intercultural education with the three dimensions of self-authorship theory: cognitive/epistemological, interpersonal, and intrapersonal. This study focuses on Heidi, an early childhood educator in a culturally diverse kindergarten. Data were collected through interviews, classroom observations, and analysis of philosophy, policy and observational documents. The multiple methods of data collection allowed for a more holistic understanding of Heidiís intercultural maturity and the contextual factors surrounding the case. Methodological triangulation was also achieved through the analysis of multiple sources of data (Stake, 1995). The findings indicated that critical reflection and reflexivity play significant roles across all three dimensions of Heidiís self-authored identity and in the development of her intercultural maturity. The implications of these findings are discussed with a focus on the potential significance of the theory of self-authorship to explore as well as enhance educatorsí critical reflection and reflexivity on intercultural experiences through the interview process.

Pre-service teachersí epistemic beliefs: Does constructivist pedagogy lead to belief change?

Quantitative methods,Pre-service teacher education,Attitudes and beliefs,Metacognition,Mathematics,Higher education

Melissa Duffy, McGill University, Canada; Krista Muis, McGill University, Canada; Michael Foy, John Abbott College, Canada;

Little research has assessed whether direct instruction about constructivist pedagogy - including explicit reflection on beliefs, modeling, and scaffolding - fosters more constructivist beliefs among pre-service teachers. Pre-service education provides a unique opportunity to examine these relations given that these individuals are preparing to become teachers and the beliefs they espouse are likely to impact their future practices and pedagogical approaches in the classroom. As such, the goal of this study was to examine the nature of beliefs about knowledge and learning within the context of pre-service teacher education. Specifically, we examined whether pre-service teachers beliefs (i.e., education majors) became more constructivist after exposure to constructivist pedagogy, compared to non-education majors. One hundred and twenty-four students completed the Epistemic Beliefs Inventory and Motivated Strategies for Learning Questionnaire. Results revealed that, as predicted, beliefs became significantly more constructivist at higher levels of education. Furthermore, pre-service teachers espoused significantly more constructivist beliefs about the speed of knowledge acquisition, compared to non-education majors. However, contrary to our predictions, non-education majors espoused significantly more constructivist beliefs about the source of knowledge, compared to pre-service teachers. The findings are discussed in terms of implications for promoting constructivist beliefs for pre-service teachers through instructional strategies, such as explicit reflection on beliefs, modeling, and scaffolding. Theoretical considerations, such as the asynchrony of belief change and catalysts for change will also be discussed.

Mrs. M.ís epistemic reflections as part of the epistemic climate of a science lesson

Case studies,Qualitative methods,Attitudes and beliefs,Reflection,Science education,Primary education

Florian Feucht, The University of Toledo, United States;

This qualitative study explores the epistemic beliefs of a science teacher about the nature of science and the epistemic underpinnings of teaching the subject matter. The Educational Model of Personal Epistemology was operationalized as a research framework to define components and relations of the epistemic climate. Semi-structured interviews, classroom observations, and document analyses were conducted to investigate the epistemic beliefs of the teacher/ Mrs. M. The results describe epistemic beliefs of Mrs. M as mainly evaluativistic in nature, while her epistemic beliefs about instruction and her instructional practice were more absolutistic. The Educational Model of Personal Epistemology is introduced and discussed as reflective tool to foster epistemic development in teachers.

Changing personal epistemology in teaching & teacher education: A focus on reflection & reflexivity

In-service teacher education,Pre-service teacher education,Teacher professional development,Teaching/instruction,Attitudes and beliefs,Conceptual change

Gregory Schraw, University of Nevada, United States; Mary Ryan, Queensland University of Technology, Australia;

The presentation will report on the outcomes of an EARLI Advanced Study Colloquium 2015 entitled ìChanging personal epistemologies in teaching and teacher education: a focus on reflection and reflexivityî which will take place immediately before the conference. The colloquium will 1) investigate a new conceptual framework for understanding how explicit reflection on personal epistemologies might be developed through a focus on reflexivity, 2) explore how earlier research which has advocated for explicit reflection on personal epistemologies can be better understood and operationalized using a model of reflexivity, and 3) investigate how this proposed new conceptual framework might be used to understand rich qualitative methodologies that support reflection on personal epistemologies for participants.

J 30

28 August 2015 08:45 - 10:15

Room Purple_H3 (Rialto)

Special session

Assessment methods and tools

Frontline Learning Research Panel Discussion

Keywords: Achievement,Action research,Argumentation,Artificial intelligence

Sig's: SIG 1 - Assessment and Evaluation

Chairperson: Sanne Akkerman, Utrecht University, Netherlands

Organiser: Sanne Akkerman, Utrecht University, Netherlands

Organiser: Sanna Jarvela, University of Oulu, Finland

Discussant: Erno Lehtinen, University of Turku, Finland

What new ideas, methodologies or discoveries are coming up in our field? In what way do these open up new avenues in thinking about and studying learning and education? This question lies at the heart of Frontline Learning Research (FLR), the newest EARLI journal. To identify and discuss what is frontline at this moment, we have asked EARLI Special Interest Groups to join our FLR panel discussion and state what they consider to be frontline themes worthwhile pursuing. How are the participating Special Interest Groups considering their frontline research perspectives? Do they highlight underlying theoretical shifts taking place in our field, or changes in our methodological approaches? Or are the frontline issues and observed changes highly specific per domain?

Frontline Learning Research Panel Discussion

Action research,Case studies,Comparative studies,Content analysis

Thomas Martens, Medical School Hamburg, Germany;

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Frontline Learning Research Panel Discussion

Action research,Case studies,Comparative studies,Content analysis

Stephen Billett, Griffith University, Australia;

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Frontline Learning Research Panel Discussion

Action research,Case studies,Comparative studies,Content analysis

Andreas Gegenfurtner, Maastricht University, Netherlands;

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Frontline Learning Research Panel Discussion

Action research,Case studies,Comparative studies,Content analysis

Wouter R. van Joolingen, Utrecht University, Netherlands;

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Frontline Learning Research Panel Discussion

Action research,Case studies,Comparative studies,Content analysis

Rupert Wegerif, University of Exeter, United Kingdom;

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Frontline Learning Research Panel Discussion

Action research,Case studies,Comparative studies,Content analysis

Baruch Schwarz, Hebrew University, Israel;

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K3 1

28 August 2015 11:00 - 12:30

Room Purple_H3 (Rialto)

Keynote

Cognitive development

Educating the developing mind: Bridging psychological research with educational practice

Keywords:

Sig's: SIG 3 - Conceptual Change

Chairperson: Filip Dochy, University of Leuven, Belgium

Educating the developing mind: Bridging psychological research with educational practice

Cognitive development,Cognitive skills,Conceptual change,Developmental processes

Andreas Demetriou, University of Nicosia, Cyprus;

We will first summarize an overarching theory of cognitive organization and development integrating cognitive, developmental, and differential approaches to intelligence. The theory specifies a common core of processes (Abstraction, representational Alignment, and Cognizance) underlying inference and meaning making. This core develops over four reconceptualization cycles (episodic representations, representations, rule-based concepts, and principle-based

concepts starting at birth, 2, 6, and 11 years, respectively) with two phases in each (production of new mental units and alignment). This sequence relates with changes in processing efficiency and working memory in overlapping cycles such that relations with efficiency are high in the production phases and relations with WM are high in the alignment phases over all cycles. Reconceptualization is self-propelled because the core is continuously upgraded generating inferential possibilities of increasing inclusiveness and flexibility. Based on this theory, a model for education is proposed that specifies, first, educational priorities for different phases of development according to the cognitive developmental milestones associated with each phase. We will also specify how we can educate students to (1) advance their general inferential and problem solving capabilities, (2) use their central executive capacity efficiently, (3) learn how to learn and become critical thinkers, and (4) construct mental models to support conceptual change in specific domains. Special examples will be drawn for the education of students at risk for illiteracy and innumeracy.

K3 2

28 August 2015 11:00 - 12:30

Room Mitropoli

Keynote

Emotion and affect

Well-being and academic learning

Keywords:

Sig's: SIG 8 - Motivation and Emotion

Chairperson: Hans Gruber, University of Regensburg, Germany

Well-being and academic learning

Teacher professional development,Teaching/instruction,Emotion and affect,Emotion and cognition

Tina Hascher, University of Bern, Switzerland;

In the last 20 years research on learning and instruction has increasingly integrated non-cognitive aspects such as learnersí emotions. Besides discrete emotions more holistic affective experiences such as subjective well-being should deserve attention as it can be assumed that they foster successful learning. Although it is evident that subjective well-being is relevant for learning in academic settings, empirical research is still rather small. In my presentation I will address the role of subjective well-being in academic learning settings from school to university. In accordance with different sub-disciplines of psychology subjective well-being will be introduced

as a key concept for human functioning that consists of cognitive, emotional, and physical components, i.e. a learnerís thoughts, feelings, and bodily sensations. Based on theoretical considerations I will explain the concept of subjective well-being and argue that well-being serves three main functions: (a) it indicates if learners perceive the learning environment as positive, (b) it is conducive to the learning process, and (c) as a resource it helps learners to cope with negative influences on learning and individual development. Then I will present a series of my empirical studies that investigate the correlates and predictors of subjective well-being and the importance of subjective well-being for academic settings. Finally I will discuss how well-being research can contribute to a better understanding of academic learning and teaching and what can be learned from this for teacher education.

K3 3

28 August 2015 11:00 - 12:30

Room Carob Mills

Keynote

Learning in context

Expansive learning across time, space, and hierarchical levels

Keywords:

Sig's: SIG 2 - Comprehension of Text and Graphics

Chairperson: Roger Saljo, Goteborg University, Sweden

Expansive learning across time, space, and hierarchical levels

Mixed-method research,Economics of education,Social aspects of learning,Learning in context

Yrjo Engestrom, University of Helsinki, Finland;

Research on learning faces the problem of multiple levels: How is individual learning related to group learning, organizational learning, and learning in multi-organizational fields or networks? Research on implementation of innovations faces the problems of scaling up and sustainability: How is a local innovation distributed and generalized so as to have widespread and sustainable societal impact? This dual challenge is addressed in educational research by scholars such as Cobb and Jackson (2012), Datnow, Hubbard and Mehan (2002), Downing-Wilson, Lecusay and Cole (2011), and Scherrer, Israel and Resnick (2010). Hubbard, Mehan and Stein (2006) integrate the levels of learning problem and the implementation problem, regarding the educational reform itself as a learning process. I will take the same stance and attack the dual problem with the help of the theory of expansive learning (Engestrom, 1987). Levels of learning need to be examined as levels in hierarchical structures of decision making, policy formation and

power. The dilemma is that top-down reforms are typically poorly grounded in practical experience and thus meet with resistance ñ and bottom-up innovations are seldom endorsed by higher authorities, thus remaining local and difficult to sustain. I will argue that this dilemma may be transcended by introducing two additional dimensions into the analysis, namely those of temporal and spatial distribution. This means (a) that learning and innovation are seen as long-term cyclic processes characterized by discontinuities, and (b) that learning and innovation are seen as taking place in multiple sites and by multiple subjects in parallel. I will suggest two mechanisms, namely bridging (Engestrom, Kerosuo & Kajamaa, 2007) and knotworking (Engestrom, Engestrom & Vahaaho, 1999), that may be developed and utilized as instruments for exploiting the two dimensions. I will discuss certain social movements as examples of powerful uses of the two mechanisms. I will apply the three-dimensional framework in an analysis of two cases, namely (1) the case of building a new concept of educational management in the school system of Sao Paulo in Brazil, and (2) the case of creating and implementing a new concept of physical mobility in the municipal home care of the elderly in Helsinki, Finland. Both cases represent long-term formative interventions aimed at multi-level expansive learning and practical implementation of a demanding innovation.

K 1

28 August 2015 13:45 - 15:15

Room Purple_H2

Paper Presentation

Attitudes and beliefs

Attitudes and beliefs

Keywords: Experimental studies,Quantitative methods,Student learning,Achievement,Primary education,Teaching/instruction,Attitudes and beliefs,Secondary education,Motivation and emotion,At-risk students,Social sciences,Pre-service teacher education,Goal orientation,Self-efficacy

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 11 - Teaching and Teacher Education,SIG 21 - Learning and Teaching in Culturally Diverse Settings,SIG 8 - Motivation and Emotion

Chairperson: Fabio Dovigo, Bergamo University, Italy

Teachersí implicit and explicit ethnic biases and their relationship to student achievement

Experimental studies,Quantitative methods,Student learning,Achievement,Primary education

Elizabeth R Peterson, University of Auckland, New Zealand; Christine Rubie-Davies, University of Auckland, New Zealand; Danny Osborne, Univerisity of Auckland, New Zealand; Chris Sibley, Univerisity of Auckland, New Zealand;

The ethnic achievement gap is a well-known problem across many countries. Some researchers have suggested that ethnic minority students are more susceptible to negative teacher expectations than their ethnic majority counterparts, but the findings are mixed. These inconsistencies may be due to the fieldís over-reliance on explicit measures of expectationsómeasures that are prone to social desirability biases. As such, teachersí implicit expectations may tell a different story. The current study uses a multi-level analytic framework to provide the first investigation of primary school teachersí (N = 35) implicit and explicit expectations, as well as the influence these expectations have on 1060 studentsí reading and mathematics achievement over the school year. Results suggest that teachersí explicit expectations have a stronger influence on student achievement when their implicit biases are low. Additionally, less biased teachers tend to have higher explicit expectations, which is likely to send a strong and coherent message to students that their teachers believe in them and expect them to do well. In contrast, teachers with high levels of implicit bias appear to send mixed messages about their expectations to students. We suggest that the use of implicit and explicit expectation measures may be a useful addition to future research, and may help clarify some of the inconsistencies in the literature.

The relevance of mindsets for education: Finnish teachersí perceptions on giftedness

Teaching/instruction,Attitudes and beliefs,Primary education,Secondary education,Motivation and emotion

Sonja Laine, University of Helsinki, Finland; Elina Kuusisto, University of Helsinki, Finland; Kirsi Tirri, University of Helsinki, Finland;

The paper presents the results of a study in which two independent cases were used to investigate Finnish teachersí perceptions on giftedness. Gagneís DMGT-model and Dweckís mindset theory form the theoretical background of this study. The first case (quantitative) measured teachersí (N= 463) perceptions with Dweckís instrument and the second case (qualitative) examined teachersí (N=212) own definitions of giftedness with inductive-oriented content analysis. The results of the first case show that Finnish teachers have mainly a growth mindset on giftedness. In contrast the case 2 revealed that giftedness is seen mainly as being something that separates a person from the others, special kind of knowledge and ability, thinking and creating new things and learning with ease. Case 2 also points out that the growth mindset type of definitions were only minimally present in teachersí perceptions. This paper thus reveals the importance of continuing to explore teachersí mindsets, and building mixed method research design in order to obtain more detailed knowledge on mindsets and its appearance in conceptions, language and action with gifted students

Sense of Belonging to School ñ The role of parental education and studentsí attitudes towards school

Quantitative methods,At-risk students,Attitudes and beliefs,Social sciences,Secondary education

Tamara Marksteiner, University of Mannheim, Germany; Susanne Kuger, The German Institute for International Educational Research (DIPF), Germany;

Worldwide, studentsí health and subjective well-being are increasingly regarded to be important. One central noncognitive aspect which threatens studentsí well-being and which is related to studentsí socioeconomic background is whether they feel they socially belong to their social context (e.g., school) or feel socially ostracized. The present study investigated the relation between parentsí education and studentsí sense of belonging to school and the role of studentsí and parentsí attitudes as mediators. To test the research question data from the Programme of International Student Assessment (PISA) 2012 were used. The sample includes data from 11 countries worldwide, 4153 schools, and 103792 15-year old students. Hypotheses were tested on the basis of structural equation modeling with country and school as cluster variables. The results indicate that students whose parentsí have a higher education level feel less socially excluded. As expected, studentsí attitudes towards school function as a mediator: The more educated the studentsí father, the more positive the studentsí attitudes towards school. Likewise, the more positive their attitude is, the stronger they indicated a feeling of social belonging and the less they feel socially excluded. Parentsí attitudes towards school did not serve as a mediator. Since sense of belonging showed only very low intraclass correlation on the school and country level, no further predictors were introduced. One practical implication is to change studentsí attitudes towards school by modifying the school environment.

Studentsí categorization and motivation: A study to apprehend teachersí knowledge about students

Pre-service teacher education,Attitudes and beliefs,Goal orientation,Self-efficacy,Secondary education

Lara Laflotte, Universite de Geneve, Switzerland; Philippe Wanlin, University of Geneva, Switzerland;

Several approaches have been used in the literature to investigate teachersí knowledge on their students. This contribution focuses on Horstermann and Krolak-Schwerdtís approach (2010) using pre-service teachersí student profile descriptions. As this research doesnít examine if studentís profiles are linked to teachersí perceptions of studentsí performance or motivation, we propose a complementary task consisting in a prediction of studentsí motivation. We get 622 student profile descriptions from a sample of 98 student teachers graduating for secondary education at the University of Geneva. W cluster-analyzed the scores of descriptive characteristics based on the difference between positive and negative frequencies in five semantic fields: classroom behavior, academic performance, participation and personality. A sub-sample of 59 student teachers did the complementary task consisting in attributing for each student profiles a probability to be male or female and a motivational code. This code referred to: achievement goal orientation (Dweck & Elliot, 1983; Nicholls, 1984), self-efficacy beliefs (Bandura, 1986) and control attributions (Weiner, 1992). The descriptions were cluster-analyzed. We get three to four clusters of student types ranging from good student types to disruptive or

insipid student profiles. Motivational code analysis indicates that student teachers perceive that the disruptive students explain their successes or failures less often with internal causes. They think good students more often pursue mastery goals, have higher self-efficacy beliefs, and more often report internal causes to interpret their successes or failures. Finally, the analysis showed that higher probability to be a female is allotted to the most favorable profiles.

K 2

28 August 2015 13:45 - 15:15

Room Green_A1

Paper Presentation

Classroom discourse

Classroom discourse

Keywords: Conversation/ Discourse analysis,Student learning,Teacher professional development,Argumentation,Culture,Cooperative/collaborative learning,Experimental studies,Design based research,Ethnography,Video analysis,Instructional design,Social aspects of learning,Vocational education,Language (Foreign and second),Primary education,Communities of practice

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 26 - Argumentation, Dialogue and Reasoning

Chairperson: Filipa De Sousa, University of Oslo, Norway

Exploring the potential of an analytic framework for classroom dialogue across cultural contexts

Conversation/ Discourse analysis,Student learning,Teacher professional development,Argumentation,Culture,Cooperative/collaborative learning

Sara Hennessy, University of Cambridge, United Kingdom; Sylvia Rojas-Drummond, National Autonomous University of Mexico, Mexico; Rocio Garcia Carrion, University of Cambridge, United Kingdom; Rupert Higham, University of Cambridge, United Kingdom; Christine Howe, University of Cambridge, United Kingdom; Fiona Maine, University of Cambridge, United Kingdom; Maria Jose Barrera, University of Cambridge, United Kingdom; Nube Estrada, National Autonomous University of Mexico, Mexico; Flora Hernandez, National Autonomous University of Mexico, Mexico; Rosa Maria Rios, National Autonomous University of Mexico, Mexico;

The research sought to develop a framework for analysing classroom dialogue that could be applied across a range of cultural and educational settings. This paper, in which we report the

development, empirical testing and refinement of the coding scheme, is the result of a collaborative venture between two large research teams based in the UK and Mexico, through a 3-year, British Academy funded project. In order to explore the potential of the coding scheme, the researchers have tested it in classroom settings across age phases and subject areas, and across different types of interactional contexts in classrooms including whole class, group and paired work. Our analytical framework is situated within a socio-cultural paradigm, and draws on Hymesí Ethnography of Communication to highlight the importance of context. We aimed to determine what units of analysis would be most effective and how such a tool could be used in practice. We found that concentrating on the ëcommunicative actí to explore ëdialogueí between speakers was an appropriate level of granularity, while clustering the codes according to function of the acts helped to highlight dialogic episodes. We report on the application of the scheme across different cultural educational settings and reflect on its fitness for purpose, including perceived limitations.

Learning from reading online argumentive discussions: Rhetoric style matters again

Experimental studies,Student learning,Argumentation,Cooperative/collaborative learning

Christa Asterhan, Hebrew University of Jerusalem, Israel;

Recent research shows that rhetoric style affects the extent to which learners profit from participating in argumentative discussions: When rhetoric style is disputative (a focus on who is right?) students learn less when compared to a deliberative style of argumentation (which idea is right?), even when all other factors are held constant (Asterhan & Babichenko, in press; Asterhan et al., 2010). In the present study, we extend this research to a setting in which students read argumentive discussions. Sixty undergraduates were asked to read a (fake) argumentive discussion between 4 students of an online, course-related discussion group. The discussion revolved around a social-economic-ethical, ëhotí topic of debate and contained several links to online resources in support of the discussantsí opinions. Two different online discussions were created to reflect either a disputative or deliberative discourse goal, while controlling for all other verbal content. Students in a control condition only received the links to the same online resources, without the discussion. Following the reading phase, declarative knowledge on the topic was significantly lower in the disputative discourse condition, but no differences were found between the deliberative argumentation and the control condition. Reading behavior measures (time-on-task, time spent reading the online information resources, number of online information sources, time spent reading the discussion) could not account for the differences in knowledge performance. A program for future research is outlined to explore the effects of learning through reading discussions, the role of argumentive style, and the affective and cognitive processes underlying them.

Wild things: Video-based interaction study on vocational students with problematic school careers

Design based research,Ethnography,Video analysis,Instructional design,Social aspects of learning,Vocational education

Peter F. E. Sloane, University of Paderborn, Germany; Bernd Gossling, University of Paderborn, Germany; Desiree Daniel, University of Paderborn, Germany;

Integrating students with problematic school careers into the labour market is one of the current core problems of vocational education in Europe. The present case study explores a German vocational school, which uses open space team-teaching and a project-based structure to school a group of students, who shall be prepared for initial vocational training. In-depth video analysis is put to use in order to identify the studentsí and teachersí interaction logics. This is done on the micro level ñ focussing on the single interactive situations ñ and on macro level ñ taking also into consideration how previous experiences and instructional design decisions by the teachers shape the environment, where the interactions take place. This is done within an on-going design-based research project aiming at innovative concepts for teaching and learning. The preliminary findings show that students are indeed taking up learning prompts provided by the teachers predominantly in form of paper-based assignments. But a large share of the observed activities involves games such as seek-and-hide in a touchy-feely manner. Teachers are occasionally invited to these games. Some of their instructional prompts are re-interpreted and included to such games. In the end, teachers feel to keep up order by showing disciplinary behaviour. All this can be seen as part of a conflict on how the relatively open school environment shall be filled from the perspective of students and teachers. Part of the problem is a mismatch between instructional meta-design, micro interactions and previous experiences of students and teachers. These kinds of problems can only be solved considering both micro and macro levels of teaching and learning.

Teacher professional development using classroom videos: Effects on dialogic practices

Conversation/ Discourse analysis,Video analysis,Teacher professional development,Language (Foreign and second),Primary education,Communities of practice

Valeska Grau, Pontificia Universidad Catolica de Chile, Chile; Elisa Calcagni, Pontificia Universidad Catolica de Chile, Chile; David Preiss, Pontificia Universidad Catolica de Chile, Chile;

This paper presents an in-depth analysis of teacher change within an in-service Professional Learning Community [PLC] conducted in Chile. One of the main aims of the study was to address the need for high quality dialogue in the classrooms as a privileged tool for developing studentsí thinking (Alexander, 2008). International studies have addressed this issue by establishing teacher PLCs (i.e. Hennessy, Mercer & Warwick, 2011; van Es & Sherin, 2008). Following these approaches, we implemented a year-long PLC program with 2 researchers and 7 Spanish Language teachers from K5 to K8 teaching in public schools. The work was based on observing and reflecting on classroom videos from other teachers and participants, aiming at developing teachersí attention towards studentsí thinking and quality of dialogue. Mixed methods were used to analyse teacher learning in terms of their professional vision, showing a significant improvement in their ability to notice classroom interactions and focusing on studentsí thinking. Socio-cultural discourse analysis was employed to address dialogue in the PLC meetings, showing qualitative differences between teachers. Five of the participants were found to improve their use of intended reflective strategies. Pre- and post- classroom videos were

recorded and analysed to assess the transference of the focus on classroom dialogue to their lessons, showing that teachers who improved in the meetings also progressed in the number of dialogic episodes found in their classrooms. Results point to the possible relevance of the quality of participation in teacher dialogue as critical in fostering teachersí dialogic classroom practices.

K 3

28 August 2015 13:45 - 15:15

Room Green_A2

Paper Presentation

Collaborative and cooperative learning

Collaborative and cooperative learning and motivation

Keywords: Quantitative methods,Instructional design,Competencies,Learning approaches,Peer interaction,Social interaction,Conversation/ Discourse analysis,Teaching/instruction,Cognitive skills,Metacognition,History,Cooperative/collaborative learning,Experimental studies,Primary education,Goal orientation,Self-efficacy,Self-regulation,Vocational education,Motivation and emotion

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 16 - Metacognition,SIG 8 - Motivation and Emotion

Chairperson: Dagmar Festner, University of Paderborn, Germany

Social Network Analysis of Cooperative Learning in Traditional and Progressive Education

Quantitative methods,Instructional design,Competencies,Learning approaches,Peer interaction,Social interaction

Christoph Helm, Johannes Kepler University Linz, Austria;

Against the background of social cognitive learning theory (Piaget 1985, Vygotsky 1986) cooperative learning in traditional and progressive classes is investigated by means of quantitative social network analysis. Based on a sample of 720 pupils in 24 classes (12 traditionally instructed classes and 12 cooperative open learning classes) network characteristics and their relation to students' performance as well as their social competences are in focus of the study. Initial results of two classes show that the open class demonstrates a significantly higher Density than the traditional class, however both have the same Mean Degree and Reciprocity. In both classes, pupilsí degree values have a moderate, significant association with accountancy achievement and social commitment.

Effects of task characteristics on (meta)cognitive activities of high cognitive ability students

Conversation/ Discourse analysis,Teaching/instruction,Cognitive skills,Metacognition,History,Cooperative/collaborative learning

Jaap Schuitema, University of Amsterdam, Netherlands; Sonia Palha, University of Amsterdam, Netherlands; Maisha van Pinxteren, University of Amsterdam, Netherlands; Carla Van Boxtel, University of Amsterdam, Netherlands; Thea Peetsma, University of Amsterdam, Netherlands;

Collaborative learning is widely advocated as a way to provide greater challenges to students with high cognitive abilities. Whether students with high cognitive abilities will profit from collaborative learning, however, may depend on the task context, such as group composition and task instructions. In this study we investigated the effect of group composition (homogenous vs heterogeneous) and the degree of task structure on the amount of elaboration and metacognitive activities of students with high cognitive abilities during collaborative learning. 51 student 11 grade students with high cognitive ability participated in this study. 36 high cognitive ability students participated in cognitive homogenous triads and 15 in cognitive heterogeneous triads. The triads worked on a collaborative learning task in history class. 27 students worked on an ill-structured task and 24 students worked on the same task however for those students the task was relatively high-structured. The high-structured version of the task was divided in steps and included hints. The interactions of the triads were video recorded, transcribed and coded. Multilevel analysis were used to investigate the effect of group composition and task structure on the amount of elaboration and metacognitive activities. The results indicated that students with high cognitive abilities benefit from ill-structured task and working in cognitive homogeneous groups. High cognitive ability students who worked on ill-structured tasks showed more elaborative interaction than students working on relatively high-structured tasks. Students in homogeneous groups performed more metacognitive activities than the high cognitive ability students in heterogeneous groups.

Preparing students for cooperation during cooperative controversy at middle school

Experimental studies,Teaching/instruction,Peer interaction,Primary education,Cooperative/collaborative learning

Celine Buchs, University of Geneva, Switzerland; Mijal Golub, University of Geneva, Switzerland;

Cooperative learning is a powerful tool for learning, but its implementation faces several obstacles that make necessary to prepare students for cooperation. Research has underlined that cooperative training may boost cooperative learning benefits. However this kind of training can appear very demanding. The aim of the present study is to demonstrate that a short intervention focused on the valorization of cooperation for learning and proposing short preparation on cooperative skills and rules relevant for the task allows more constructive interactions and improve learning. 32 pupils from Grade 6 were involved in dyadic cooperative controversy (Johnson & Johnson, 2007) on argumentative texts for one session. For half of the pupils we introduced a short preparation for cooperation explaining why to cooperate and how to cooperate

in the specific task. First a collective discussion regarding how to display social support was proposed; in addition we explained relevant cooperative rules for controversy (listening carefully, understanding, criticizing ideas not people and focusing on common goal) at each step. Interactions during controversy were coded and individual understanding regarding the content of texts was assessed. Results indicated that pupils who were prepared to cooperate displayed more support, asked more questions and paid more attention to their partner. The overall quality of cooperation inside the dyad was also evaluated as more positive; individual understanding was the same in the two conditions. In sum a short preparation to cooperate elicited more constructive interactions.

The development in motivation of first-year students in Dutch intermediate vocational education

Quantitative methods,Goal orientation,Self-efficacy,Self-regulation,Vocational education,Motivation and emotion

Ineke van der Veen, University of Amsterdam, Netherlands; Thea Peetsma, University of Amsterdam, Netherlands;

For decades educators have been concerned about the decline in self-regulated learning behaviour of students after school transitions. Many explanations have been given for the decline in self-regulated learning behaviour in secondary school, however on students in intermediate vocational education, less is known on the development in motivation for school and on factors related to this development. Information on this is especially needed, as, in the Netherlands, in this school type the dropout rate is quite high. This leads not only to loss of qualified future workforce, but also to wastage of time and commitment from both teachers and students. In this study motivation developments of first-year students in intermediate vocational education are described and related to factors that in earlier research have been found to be related to developments in motivation after school transitions: e.g. value orientation, lack in person-environment fit (well-being connecting with fellow students and teachers), and FTP on leisure. Also relationships with non-educational risk factors and potentionally compensating factors (parental and friends expectations of schooling), and dropout were studied. Data on 616 first-year students from two intermediate vocational schools in different large cities were included in this study. The students filled in a self-report questionnaire for four times during regular class time. At the first measurement the students were on average 18 years old. Results showed a decline in self-regulated learning behaviour, mastery orientation, well-being connecting with fellow students and teachers and FTP on school and professional career, and an increase in performance avoidance goals.

K 4

28 August 2015 13:45 - 15:15

Room Green_A5

Paper Presentation

Educational attainment

Keywords: Quantitative methods,Educational technology,E-learning/ Online learning,Higher education,Lifelong learning,School effectiveness,Educational attainment,Primary education,Learning in context,Student learning,Achievement,Developmental processes,Secondary education,Motivation and emotion,Interdisciplinary

Sig's: SIG 18 - Educational Effectiveness,SIG 8 - Motivation and Emotion

Chairperson: Jan Van Damme, KU Leuven, Belgium

Examining adult learnersí persistence and performance in blended business education

Quantitative methods,Educational technology,E-learning/ Online learning,Higher education,Lifelong learning

Katie Goeman, KU Leuven, Belgium; Nick Deschacht, KU Leuven, Belgium;

This study was aimed at examing the impact of introducing blended learning in an academic business education curriculum. In particular, changes in first-year adult learnersí persistence and performance were scrutinized by means of a difference-in-differences analysis using a large administrative data set. Such technique allows for calculating net effects and controlling for variations in exam difficulty across time, and minimizing potential selection bias resulting from learnersí enrollment in a specific type of programme, either regular or blended. The analyses are focused on the overall effect on drop-out, exam performance and course pass rate, and on the particular effect per cluster of courses. According to the main results the introduction of the blended learning format has led to improved exam scores and higher course pass rates, while significantly more students dropped out of the academic business programme. Implications of these findings for theory and practice, as well as directions for future research are discussed.

Exploring determinants of performance differences in TIMSS and PIRLS in Sweden, Norway and Finland

Quantitative methods,School effectiveness,Educational attainment,Primary education,Learning in context

Kajsa Yang Hansen, University of Gothenburg, Sweden;

In a previous study, differences in the amount of variation in the level of performance between schools and classrooms were studied in Finland, Norway and Sweden (Yang Hansen, Gustafsson & Rosen, 2014). The study found substantial performance differences between schools in Norway and Sweden, which may be due to both segregation of living and school choice. In Finland, there are no school differences; instead, very substantial classroom differences have been identified. It is thus interesting to further exploring determinants of these school and

classroom differences across the three countries. And this will be the aim of the current proposal. Data is from TIMSS and PIRLS 2011of Sweden, Norway and Finland. The current study will extend the previous hierarchical linear models by bring in variables related to teacherís qualification, performance emphasis and classroom management, as well as school management, school intakes, neighborhood demographic characteristics and resources at the respective levels as predictors for the observed disparities in performance across countries. It can be expected that the class-level variables account a significant part of the between-level achievement differences in Finland, while school related variables are more important for predicting achievement differences in Norway and Sweden. The analysis will be carried out with Mixed Model procedure in SPSS.

Academic Achievement From a Developmental Perspective: GPA Trends in Lower Secondary Education

Quantitative methods,Student learning,Achievement,Developmental processes,Secondary education,Motivation and emotion

Lindy Wijsman, Leiden University, Netherlands; Matthijs Warrens, Leiden University, Netherlands; Nadira Saab, Leiden University, Netherlands; Jan van Driel, Leiden University, Netherlands; Michiel Westenberg, Leiden University, Netherlands;

A decline has been found in studentsí academic motivation during adolescence, starting at the transition from primary school to lower secondary school onward. As motivation and achievement seem to be highly related, it can be expected that performance levels show a similar decrease during these years. While academic achievement, in the form of grade point average (GPA), is very important for a studentsí school career, GPA has not been studied from a developmental perspective. In this study we aimed to investigate to what extent trends are visible in academic achievement during lower secondary education. The expectation was to find a declining pattern of achievement similar to the pattern of motivation. Multilevel analyses were performed with longitudinal GPA data of 1544 lower secondary school students from schools in The Netherlands. Results show a decline in GPA from year 1 to year 3. This decline was equal for boys and girls, although the starting point in year 1 was lower for boys. GPA development at different school types showed that the highest level, gymnasium, started highest, and decreased fastest. We conclude that achievement also follows a declining pattern in lower secondary school, as does motivation. We interpret this achievement decline in light of academic contextual factors.

Multilevel Analysis of the Factors affecting Mathematics Achievement of First-Year Secondary-school

Quantitative methods,School effectiveness,Achievement,Interdisciplinary,Secondary education

Henry Kiwanuka, KU Leuven, Belgium; Gudrun Vanlaar, KU Leuven, Belgium; Dickson Anumendem, KU Leuven, Belgium; Speranza Namusisi, Uganda Martyrs University, Uganda; Jan Van Damme, KU Leuven, Belgium;

This study explores the sources of variability in mathematics achievement for Ugandan students at student, classroom, and school level, inspired by international research. Mathematics scores at the beginning and at the end of school-year 2012, and questionnaire responses of 4819 first-year secondary students (grade 7, 14-15 years old) from 78 classes in 49 schools were analysed, using a three-level linear regression model. Results of a multilevel analysis show that, out of the total variance in mathematics achievement, 68.4%, 14.2%, and 17.4% is situated at student, classroom, and school level, respectively. Socio-economic status, gender, prior mathematics achievement, parental support, class mean of prior math achievement and of students' perception of good classroom assessment, and school mean of parental support were significant predictors of math achievement. The relevant factors explained 7.5%, 63.9%, and 77.4% of the student-, classroom-, and school-level differences respectively. Key words: multilevel analysis, mathematics achievement, Uganda, secondary education.

K 5

28 August 2015 13:45 - 15:15

Room Brown_B1

Paper Presentation

Emotion and affect

Emotion, affect and motivation

Keywords: Experimental studies,Student learning,Developmental processes,Language (L1/Standard Language),Secondary education,Inquiry learning,Quantitative methods,Emotion and cognition,Self-regulation,Higher education,Learning in context,Literacy,Peer interaction,Teaching/instruction,Achievement,Primary education,Motivation and emotion

Sig's: SIG 18 - Educational Effectiveness,SIG 23 - Educational Evaluation, Accountability and School Improvement,SIG 8 - Motivation and Emotion

Chairperson: Tuija Aro, University of Jyvaskyla, Finland

Riddle me this?

Experimental studies,Student learning,Developmental processes,Language (L1/Standard Language),Secondary education,Inquiry learning

Dirk van der Meulen, University of Amsterdam, Netherlands;

ëRiddle me this?' Using historical mystery questions to improve students' literary interpretation and motivation for literary history Background A pervasive problem in Dutch literary education is that students lack the required level of literary competence to read relatively difficult literary-historical texts. This study examines an intervention that uses mystery questions, an activating

type of pedagogy borrowed from the geography classroom, in a collaborative learning environment in secondary education. Peer discussion and contextualization are central in this pedagogy. In this study the mystery question acted as independent variable as a means of improving the dependent variables literary interpretation, topic knowledge and motivation for literary history of secondary school students. Research question What is the effect of an inquiry-based course, based on the pedagogy of mystery questions on literary interpretation, motivation and topic knowledge of secondary students? Method 44 students (11th Grade) participated in a quasi-experimental study with a pre- and posttest design. Students in the experimental condition interpreted in dyads literary-historical fragments from the Dutch Enlightenment with the pedagogy of mystery questions; students in the control condition worked in dyads with the same texts on a more traditional assignment. As pretest and posttest measurements knowledge, interpretation (far and nearby transfer) and motivation tests were used. Results Results show that students in the experimental condition were significantly more motivated for literary history than students in the control condition on the posttest. There were no significant results for literary interpretation and topic knowledge.

How am I so bored? An empirical examination of boredom types, precursors, and coping strategies

Quantitative methods,Student learning,Emotion and cognition,Self-regulation,Higher education,Learning in context

Ulrike Nett, Universitat Ulm, Germany; Thomas Goetz, Faculty for Humanities, Germany; Nathan C. Hall, McGill University, Canada;

Although boredom is an omnipresent emotion, research on boredom has just increased recently. A study by Goetz et al. (2014) addressed the specific nature of boredom experiences and proposed the differentiation of five types of boredom on the basis of valence and arousal dimensions. The goal of the present study was to investigate the interrelationship between these different types of boredom with precursors of boredom and boredom-related coping strategies. As boredom represents a multi-determined emotion, it is critical to investigate this emotion as it occurs in real-life settings, as such, data was assessed via experience sampling. Over a period of two weeks, a total of 71 university students responded to seven questionnaires per day. Constructs assessed were a) intensity of boredom, b) valence and arousal c) precursors to current boredom experiences within an achievement situation and d) coping strategies associated with current boredom experiences. By latent profile analysis, the proposed differentiation of five types of boredom could be replicated. Significant mean level differences were observed between the boredom types on lack of meaning, feeling overchallenged, and teacher dislike, with results showing these precursors to correspond most strongly with reactant boredom. Further results indicated significant mean level differences showing behavioral-approach strategies to be relatively infrequent when apathetic boredom was experienced, and cognitive-avoidance to be slightly related to reactant boredom. The findings suggest that specific knowledge of the situational context can help to determine the nature of boredom experienced, and to a lesser extent, how to best cope with it.

Mediation mechanisms explaining gender differences in reading performance: A multilevel analysis

Quantitative methods,Student learning,Emotion and cognition,Literacy,Peer interaction,Secondary education

Soi-kei Mak, University of Macau, Macau; Kwok-cheung Cheung, University of Macau, Macau; Pou Seong Sit, University of Macau, Macau;

Based on a conceptual model of reading engagement, this paper seeks to use the three facets of reading engagement (i.e. enjoyment of reading, diversity in reading, and employment of metacognitive reading strategies) to uncover the underlying mediational processes or mechanisms in the explanation of gender differences in reading literacy performance of 15-year-old students in Macao. The reading engagement mediational effects at the ìbetween-schoolî and ìbetween-student within-schoolî levels are analyzed by Hierarchical Linear Modeling (HLM), paying due attention to the multi-level nature of the PISA 2009 data. Research results show that there are five variables pertaining to the afore-mentioned three facets of reading engagement are able to mediate the ìbetween-student within-schoolî effect of gender on student literacy performance. Amongst these five there are two variables to mediate the ìbetween-schoolî effect of gender on student reading literacy performance. The research implication clear: By devising gender-inclusive reading instruction intervention programs with a bearing on the three facets of reading engagement and due attention paid to gender peer effects during group engagement in reading activities teachers can help raise student reading literacy performance of both gender, and simultaneously narrow the gender gap in reading literacy performance. The significance of this study is that gender gap in reading literacy performance is no longer a perennial issue cannot be curbed within student daily life and classroom settings. The findings contribute to a debate about the ìnature-nurtureî issue of gender gap in reading literacy favoring females found around the world today and in the past century.

Is studentsí achievement affected by teachersí emotional exhaustion?

Quantitative methods,Teaching/instruction,Achievement,Primary education,Motivation and emotion

Uta Klusmann, Leibniz Institute for Science and Mathematics Education (IPN) , Germany; Dirk Richter, Humboldt Universitat zu Berlin, Germany; Oliver Ludtke, Leibniz Institute for Science and Math Education at the University of Kiel, Germany;

Research has demonstrated that teachersí professional knowledge and motivation affect learning and motivation of students substantially. Although it has been theoretically assumed that teachersí symptoms of stress and burnout have consequences for teachersí performance in the classroom, no empirical study has tested the effects on students learning. Therefore, we investigate the effect of teacherís emotional exhaustion on studentsí achievement in mathematics. Moreover, we explore if this effect is moderated by characteristics of classroom composition. The analyses are based on a representative sample of 1104 elementary school teachers in Germany and their students. Using multilevel analysis, we control for teachers gender, years of

experience, teaching certificate and the composition of the class at the teacher level. On the student level we consider gender, language spoken at home, socio-economic status and cognitive ability as control variables. The results reveal that teachersí emotional exhaustion significantly predicts studentsí math achievement even after controlling for teacher characteristics and class composition. Moreover, we found a significant moderation effect which indicates that the effect of teachers' exhaustion is higher in those classes with a high percentage of minority students. These results stress the meaning of teachersí well-being not only for teachersí professional development but also for students learning experience.

K 6

28 August 2015 13:45 - 15:15

Room Brown_B2

Paper Presentation

Higher education

Higher education

Keywords: Quantitative methods,Student learning,Learning approaches,Problem solving,Higher education,Knowledge creation,Case studies,Teaching/instruction,Learning in context,Lifelong learning,Qualitative methods,Assessment methods and tools,Competencies,Social sciences,Mixed-method research,Social aspects of learning,Interdisciplinary,Cooperative/collaborative learning

Sig's: SIG 1 - Assessment and Evaluation,SIG 4 - Higher Education

Chairperson: Kyriaki Doumas, Linnaeus University, Sweden

Hatching Learning-Insights ñ An Exploratory ESM Study on Occurrences of Mind Pops and Insights

Quantitative methods,Student learning,Learning approaches,Problem solving,Higher education,Knowledge creation

Jana Antosch-Bardohn, Ludwig-Maximilians-Universitat (LMU), Germany; Karsten Stegmann, Ludwig-Maximilians-Universitat (LMU), Germany;

Empirical studies on instructional support for learning usually focus on how to facilitate learning processes to achieve better learning outcomes. There are, however, indications that sometimes after a period without intentional learning, a growth in knowledge occurs. Regarding to the approach of creative problem solving a period without intentional working on the problem has been termed incubation. This phase is followed by an insight, a moment where an idea comes to mind. An open issue is whether incubation and insights are limited to problem solving scenarios.

Therefore, Experience-Sampling Method (ESM) with a random delivery schedule was used to investigate to what extent incubation and insight phenomena in learning processes occur especially in the context of university lectures. Eighty-nine (N=89) students participated in a lecture in educational psychology. In the course of consecutive six days each student was surveyed 15 times on whether he or she remembered the topic of the lecture unintentionally (mind pop) and if the student experienced an insight regarding the topic of the lecture (insight). 14.5% of all responses were unintentional mind pops. 49% of all participants had insights during the whole week, i.e. unconsciously constructed new knowledge during incubation between two lectures. Insights occurred especially in phases when learners reported activities with high cognitive activation regarding different content. The results show that incubation and insight occur in the context of non-problem solving scenarios like a university lecture. One next step is to investigate how learning environments in higher education should be designed to foster these effects.

A Case-Study of Promoting Equality in Education in the Open University at the University of Helsinki

Case studies,Quantitative methods,Teaching/instruction,Higher education,Learning in context,Lifelong learning

Erja Rusanen, University of Helsinki, Finland; Taina Lehtinen, Univeristy of Helsinki, Finland; Saara Repo, University of Helsinki, Finland; Heidi Hyytinen, University of Helsinki, Finland;

Our aim was to study what are our possibilities to promote equality in education using the constructive alignment model in the higher education. We assumed that we would be able to promote equality in education applying this model resulting in lesser differences in learning outcomes. 138 students in educational basic studies in autumn 2012 took part in a computer-based test situation consisting of a CLA performance task. This task was aimed at measuring critical thinking skills (analytical reasoning, problem-solving and argumentation-writing) at collegeñlevel or higher education. This task is developed by the Council for Aid to Education (CAE) in USA and translated and modified in Finland by the University of Helsinki. During the study-year 2012-2013 the students participated in one to six courses of basic studies in educational sciences. The learning outcomes of each course were assessed and these course-grade-points (CGP) formed a grade point average (GPA). In addition to the measurements of CLA-total and GPA, we explored how the main principles of the constructive alignment model by Biggs & Tang (2007) were applied to our teaching. As main results we learned that many of the studentsí background-variables were connected to the CLA-total performance but not in the GPA of learning outcomes. The background variables in which CLA-total and in GPA were side by side analyzed were educational background, discipline, working skills, working-life experience and self-efficacy. Our results indicate that the Open University has succeeded in applying constructive alignment thus accomplishing the main target of the Open University ìTo promote the Equality of Educationî. We offer this empirical study as one model for discussion about possibilities to promote equality of education in higher education.

Teaching coordinatorsí role in competency-based assessment in Higher Education

Qualitative methods,Assessment methods and tools,Competencies,Social sciences,Higher education

Georgeta Ion, Universidad Autonoma de Barcelona, Spain; Juana Maria Tierno, Universitat Rovira i Virgili, Spain;

In the Spanish Higher Education context, the final of the academic course 2012-2013 has marked the end of the first promotion of graduates in the framework of the Bologna Process. Hence, we consider that this is a key moment to gather information regarding the perception of faculty and members about what is the role of such competencies in studentsí learning and development. The main objective is to describe the current situation in the Spanish universities, concentrating upon the following questions: what are the most common assessment practices used by academics; how do university academics evaluate their own assessment practices; who employs competency-based assessment, and how do they do it; and what are the strengths and weaknesses of the competency-based practices. The methodology uses both qualitative approach, including in depth interviews to a sample of university teaching coordinators in 7 universities in Spain and four different degrees (teacher education, informatics, industrial engineering and pharmacy). The results detected that the competency-based assessment is still under-represented in academicsí teaching practices, the assessment practices are still focused on content upon competency and despite the assessment is continuous, academics are not enough engaged with feedback processes and innovative methods of assessment. The results have shown that teachersí decisions on assessment strategies are closely related to the opportunities and limitations offered by normative and institutional decisions. The study provides a better understanding of the present situation in Spanish universities and suggests possible changes to improve the implementation of the competencies assessment model.

Does improved quality of communication in student teams indicate improved collective performance?

Mixed-method research,Teaching/instruction,Social aspects of learning,Interdisciplinary,Higher education,Cooperative/collaborative learning

Johanna Poysa-Tarhonen, University of Jyvaskyla, Finland; Jan Elen, KU Leuven, Belgium; Pasi Tarhonen, Honeywell Inc., Finland;

Together with academic knowledge, higher education institutions are expected to produce more generic skills, like collaboration, problem solving and interpersonal skills, highly valued by employers today. To meet the challenges, many of the institutions are utilizing engaging learning pedagogies, like team-based learning. However, in spite of its premises, working as teams is often more difficult than working alone. Also, teamwork in higher education tends to focus primarily on task aspects of performance at the expense of team aspects. In addition, for educators there may not be a feasible way to assess whether the students are learning to work successfully as teams. Moreover, the research on student teams is rarely based on long-term research, which excludes the developmental -perspective. This paper aims to rise to these challenges through a long-term study of 1.5 years by focusing on team-related aspects of performance. The study asks how newly formed student teams (n= 13-19) develop over time in

regard to more generic skills (i.e. communication) and whether the improvement in communication skills also indicates teamsí improved collective performance. The results did not show a linear development, but the change towards improved quality of communication in the teams was episodic. Also, there was evidence of the possible relationship between the improved quality of communication and the teamsí collective financial success. The results are useful indicators to invest in carefully designed team-based higher education practices that, together with academic knowledge construction, prepare students for working life with adequate interpersonal skills.

K 7

28 August 2015 13:45 - 15:15

Room Brown_B4

Paper Presentation

Instructional models and strategies

Instructional models and strategies

Keywords: Experimental studies,Special education,At-risk students,Mathematics,Secondary education,Learning in context,Mixed-method research,Teaching/instruction,Argumentation,Self-regulation,Writing/Literacy,Instructional design,Cognitive skills,Comprehension of text and graphics,Interdisciplinary,Primary education,Quantitative methods,Conceptual change,Physical Sciences

Sig's: SIG 12 - Writing,SIG 15 - Special Educational Needs,SIG 2 - Comprehension of Text and Graphics,SIG 3 - Conceptual Change

Chairperson: Sonia Abrantes Garcez Palha, University of Amsterdam, Netherlands

Students with Mathematics Difficultiesí Understanding and Solution of Proportion Problems

Experimental studies,Special education,At-risk students,Mathematics,Secondary education,Learning in context

Asha Jitendra, University of Minnesota, United States;

This study assessed the efficacy of a research-based intervention, schema-based instruction (SBI), on the proportional problem-solving performance of seventh-grade students at risk for mathematics difficulties in problem solving (MD). SBI emphasizes the underlying mathematical structure of problems, uses schematic diagrams to represent information in the problem text, provides explicit problem solving and metacognitive strategy instruction, and focuses on the flexible use of multiple solution strategies. As part of a larger study, teachers and their students

were randomly assigned to an SBI or control condition and teachers in both conditions then provided instruction on the topics of ratio, proportion, and percent. Based on an initial pool of 1,999 seventh graders, 812 students were identified as at risk for MD based on scores at or below the 35th percentile on a standardized test of mathematical problem solving. Results indicated that students with MD in SBI classrooms scored on average higher than their counterparts in control classrooms on a posttest and delayed-posttest administered nine weeks later. Implications for educational practice are discussed.

More than meets the eye: Self-regulated strategy development for teaching argumentative writing

Mixed-method research,Teaching/instruction,Argumentation,Self-regulation,Writing/Literacy,Secondary education

Anabela Malpique, Murdoch University, Australia; Ana Veiga Simao , Faculty of Psychology, University of Lisbon, Portugal;

This multi-method study investigated the impact of an intervention designed to promote ninth-grade studentsí writing performance, strategy use, and discourse knowledge of argumentative writing. Following the Self-Regulated Strategy Development (SRSD) model, strategies to plan and write argumentative essays were implemented in two whole-classroom settings. Twenty three students received SRSD instruction combining verbal and visual mnemonics to support learning and recall; twenty five students received SRSD instruction including verbal mnemonics alone. Groups were compared with a control group of 30 students randomly drawn from the remaining four ninth-grade classes receiving standard writing instruction. Results of multivariate analyses of variance (MANOVAs) and follow-up univariate tests supported the incremental effects of combining verbal and visual mnemonics to the SRSD instructional routine, with meaningful effects on studentsí writing performance and reported use of non-genre-specific personal strategies at posttest. National exams completed 15 weeks after instruction reinforced the effectiveness of the implemented SRSD strategies.

Student differences and aptitude-by-treatment interactions in 5th-6th grade mind map interventions

Instructional design,Teaching/instruction,Cognitive skills,Comprehension of text and graphics,Interdisciplinary,Primary education

Emmelien Merchie, Ghent University, Belgium; Hilde Van Keer, Ghent University, Belgium;

When students transit from primary to secondary education, learning from informative texts becomes increasingly important. Implementing researcher-provided and student-generated mind maps into a strategy instruction are two instructional approaches already shown to be effective in stimulating primary school studentsí spontaneous and independent text-learning strategy use. However, as not all learners are alike in their need for instruction, various student characteristics can influence the interventionís effectiveness. Furthermore, also aptitude-by-treatment interactions might occur. This study investigates by means of a quasi-experimental repeated

measures design in fifth and sixth grade (a) to what extent student characteristics are related to text-learning strategy use when working with either researcher-provided or student-generated mind maps and, (b) whether interaction effects between these instructional approaches and student characteristics can be found. Multilevel piece-wise growth analysis was applied to examine the growth in studentsí self-reported and observed text-learning strategy use in relationship to class-level (i.e., instructional approach) and student-level characteristics (i.e., gender, grade, home language, achievement-level, and learner profile). Results show that, when working with researcher-provided mind maps, mainly effects of gender and learner profile are shown, whereas achievement-level differences are the most influencing student characteristic when working with student-generated mind maps. Surprisingly, no significant aptitude-by-treatment interaction were found regarding gender, grade, home language and achievement level. As to studentsí learner profile, different aptitude-by-treatment interactions were found. This study points at the importance of considering student characteristics when implementing and evaluating the effectiveness of instructional mind map interventions.

How teachers can boost conceptual and procedural knowledge in physics classes

Experimental studies,Quantitative methods,Instructional design,Conceptual change,Physical Sciences,Secondary education

Elsbeth Stern, ETH Zurich - Research on Learning and Instruction, Switzerland; Ralph Schumacher, ETH Zurich, Switzerland; Sarah Hofer, ETH Zurich, Switzerland; Herbert Rubin, Gymnasium Reamibuehl, Switzerland;

For the field of mechanics, it has been shown that students enter classes with various naive beliefs and misconceptions, and the majority still holds them after having undergone regular instructions by professional physics teachers. Together with in-service-teaches we enriched the curriculum of mechanics with elements of instruction that had been proven to encourage and enable deeper processing and conceptual change. These are, among others, (1) confronting students with phenomena and situations that are incompatible with their naive concepts and explanations, (2) instructing students to generate (a) self-explanations and (b) metacognitive questions dealing with the topics at hand. Four experienced physics teachers in charge of two parallel classes applied the enriched curriculum in one class. The other class was taught in the traditionally way strong with focus on quantitative problems. Altogether, 172 Swiss students from higher secondary school (age 15-16 years) participated. Tests on conceptual understanding and transfer as well as on procedural knowledge for quantitative problem solving were administered immediately after the curriculum (post) as well as three months later (follow-up). Hierarchical regression models revealed a significant superiority of the enriched curricula over the conventional ones. This result clearly demonstrates that a focus on conceptual knowledge in physics classes pays off.

K 8

28 August 2015 13:45 - 15:15

Room Green_A6

Paper Presentation

Learning approaches

Learning approaches

Keywords: Student learning,Developmental processes,Learning approaches,Interdisciplinary,Early childhood education,Lifelong learning,Case studies,Professions and applied sciences,Higher education,Assessment methods and tools,Achievement,Attitudes and beliefs,Cognitive development,Cognitive skills,Primary education,Quantitative methods

Sig's: SIG 1 - Assessment and Evaluation,SIG 4 - Higher Education,SIG 5 - Learning and Development in Early Childhood

Chairperson: Ann-Kathrin Pehmer, Technische Universitat Munchen (TUM), Germany

Children's readiness for lifelong learning to close the achievement gap. An Italian framework

Student learning,Developmental processes,Learning approaches,Interdisciplinary,Early childhood education,Lifelong learning

Cristina Stringher, Istituto Nazionale per la Valutazione del Sistema Educativo di Istruzione e di Formazione (INVALSI), Italy;

Participation in Early Childhood Education and Care (ECEC) could aid closing the achievement gap of at risk youth in subsequent school levels. Increasing interest is thus placed on child outcomes at the end of ECEC and on readiness assessment in first grade. Global organizations are proposing studies in this area, yet the core difficulty lies in the definition and selection of child outcomes and readiness competencies: should researchers consider just cognitive measures, or should they include additional aspects? Which ones? How do these aspects interact in children to build those competencies that are pre-requisites to school readiness and lifelong learning? In Italy, similar questions have emerged during the exploratory phase of a baseline assessment study under development. This paper explores such questions from a theoretical standpoint and it is based upon a literature search on child development, child outcome assessment in ECEC and baseline assessment in primary education. The output is a definition and a matrix of school readiness for lifelong learning, based upon learning to learn to be preserved in children. The theoretical significance of this exploration is twofold: a) it aims at a coherent framework for child outcome assessment in ECEC or for baseline assessment in first grade; b) it is meant to contribute to the debate on competency building from the early years and to warn teachers on the importance of nurturing the innate desire of the child to learn, rather than thwarting it. Concrete applications are derived for both assessment methodologies and teaching practices.

Flipping with a Framework: Fostering reflective thinking beyond discipline specific content

Case studies,Learning approaches,Professions and applied sciences,Higher education

Sophie Karanicolas, University of Adelaide , Australia; Catherine Snelling, University of Adelaide , Australia; John Willison, University of Adelaide , Australia; Tracey Winning, University of Adelaide , Australia;

The translation of flipped learning into effective classroom practice presents educators and students with innate challenges. Two pilot studies conducted in an undergraduate human biology course at the University of Adelaide demonstrate how effectively designed flipped learning sequences can be achieved. Using a pedagogical Research Skills Development Framework (RSD) and 10 key elements of effective flipped learning to design learning activities pre, during and post classroom time, the learning spaces have transformed into highly charged student driven forums. As students take control of their learning, they become self-reflective practitioners and develop thinking skills beyond the acquisition of discipline specific content.

Online measurement of learning to learn in early school years

Assessment methods and tools,Achievement,Attitudes and beliefs,Cognitive development,Cognitive skills,Primary education

Anita Habok, University of Szeged, Hungary;

Learning to learn is a concept having a wide range of interpretations. Numerous definitions of learning to learn have been published in the past couple of decades. The traditional approach to learning to learn started out with two dimensions, namely, the cognitive and the socio-cultural dimension, and was subsequently complemented with the metacognitive dimension. Research on learning to learn has long traditions at the Universities of Helsinki, Bristol and Amsterdam, which provided a model for our research design. Our sample was composed of Hungarian elementary school students from Years 1 to 6. Childrenís knowledge was evaluated in three domains (reading, mathematics and reasoning), and a set of metacognitive monitoring tasks were also used. In addition, a questionnaire about childrenís learning characteristics was also administered. The main results of the cognitive tasks showed differences between the school years in some cases. The mathematics and reading competency tests revealed significant differences between Years 1 and 2, Years 3 and 4, and Years 5 and 6. Years 2, 4, and 6 performed significant higher. For the reasoning tasks we did not register statistically significant differences between the Years. In the affective field we found significantly decreasing trends in most areas. Year 3 showed a turning point in this sample since the studied affective areas started to show a decline. In our presentation we analyse the childrenís results in more detail and discuss the relationships among the studied domains.

Organised effort and approaches to learning as predictors of academic achievement

Quantitative methods,Student learning,Achievement,Learning approaches,Higher education

Kim Jesper Herrmann, Aarhus University, Denmark; Anna Bager-Elsborg, Aarhus University, Denmark;

Background: Concepts of deep and surface approaches to learning are well established within higher education research and recently the concept of organised effort has been added as a concept describing studentsí learning strategies. Approaches have been linked to academic achievement; however, in a recent meta-analysis the average correlations tended to be rather weak and results varied considerably between studies. Aim: To further explore the extent to which approaches to learning and organised effort predict academic achievement. Sample: 3,625 students representing 40 programmes within the business and social sciences (e.g. law, psychology, political science, and economics). Methods: Approaches to learning and organised effort were measured using 12 items from a section of the Learn questionnaire which is a modified version of the ETLQ. Multilevel linear modelling allowed us to analyse a large sample covering a multitude of academic programmes without violating the assumption of independence of errors. Results: A two-level hierarchical model assessed the effect of organised effort and deep and surface approaches to learning on academic achievement. Age, gender, prior academic achievement and study year were included as control variables. Academic achievement, measured as the studentsí average grade on the end-semester examination, was positively related to organised effort and negatively related to a surface approach. However, the average correlation between achievement and a deep approach was non-significant. Finally, the effect of a surface approach varied across educational programmes. Conclusion: Organised effort and a surface approach predicted academic achievement; however, a deep approach did not.

K 9

28 August 2015 13:45 - 15:15

Room Green_A7

Paper Presentation

Mathematics education

Mathematics education

Keywords: Experimental studies,Problem solving,Mathematics,Primary education,Neuroscience,Cognitive skills,Numeracy,School effectiveness,Competencies,Lifelong learning,Quantitative methods,Student learning

Sig's: SIG 11 - Teaching and Teacher Education,SIG 18 - Educational Effectiveness,SIG 22 - Neuroscience and Education,SIG 3 - Conceptual Change

Chairperson: Minna M Hannula-Sormunen, University of Turku, Finland

Improving Problem Solving Skills by Enriching Word Problems Used in Mathematics Teaching

Experimental studies,Problem solving,Mathematics,Primary education

Nonmanut Pongsakdi, University of Turku, Finland; Teija Laine, Centre for Teacher Training, Turku, Finland; Koen Veermans, University of Turku, Finland; Minna Hannula-Sormunen , University of Turku, Finland; Erno Lehtinen, University of Turku, Finland;

Over the last few decades, the traditional practice of word problems in classroom mathematics has been heavily criticized by several educators and researchers for restraining a genuine disposition towards mathematical modelling in students. Students have an inclination to apply superficial strategies and exclude several important steps of modelling process. In this quasi-experimental study, we developed a Word Problem Enrichment programme (WPE). The idea of the WPE is to encourage teachers to use innovative self-created problems to improve mathematical modelling and problem solving skills in students. Participants included the experimental group of 5 teachers with their 98 students, and the control group of 4 teachers with their 72 students from elementary schools located in southwest Finland. The intervention effectiveness on studentsí problem solving performance was investigated. The results suggested that the enriching word problems used in mathematics teaching is a promising method to improve studentsí problem solving skills when solving application word problems.

Electrophysiological correlates of symbolic and non-symbolic numerosity processing

Experimental studies,Neuroscience,Cognitive skills,Numeracy,Mathematics,Primary education

Anne van Hoogmoed, Utrecht University, Netherlands; Evelyn Kroesbergen, University of Utrecht, Netherlands;

In the current study, we investigated the electrophysiological correlates of magnitude representations, controlling the non-symbolic magnitudes for visual input. Contrary to former ERP studies, we used a match-to-sample task. This task has been shown to tap into magnitude representations without concurrently measuring decisional processes, as is the case in the comparison distance task (Van Opstal et al., 2008; Van Opstal & Verguts, 2011). Ten adult participants performed an adapted version of the match-to-sample task. Two stimuli were presented after each other, both for 750 ms, and participants had to respond only if the target matched the sample (10% of the trials). Next to tasks with non-symbolic samples and targets, and symbolic samples and targets, tasks with non-symbolic samples and symbolic targets and vice versa were included to investigate mapping of symbolic and non-symbolic numerosity. The results show that symbolic targets preceded by non-symbolic samples elicited early parietal distance effects. Non-symbolic targets showed a widely distributed distance effect in a later time window, around 300-400 ms. When preceded by symbolic samples, these targets also showed an earlier parieto-occipital distance effect. This shows that symbolic magnitudes are processed differently from non-symbolic magnitudes, and that non-symbolic numerosity processing depends on task requirements. The results indicate that mapping symbolic and non-symbolic numerosity onto each other may be a separate component of number sense, in addition to symbolic and non-symbolic number sense. Future ERP-research could gain insight in the development of these components at a neural level.

DIF Analysis and Teacher Accounts on Relative Difficulty of TIMSS 2011 Grade 4 Items in 5 countries

School effectiveness,Competencies,Mathematics,Primary education,Lifelong learning

Jelena Radisic, Institute for Educational Research (Belgrade), Serbia; Aleksander Baucal, University of Belgrade, Serbia; Smiljana Josic, Institute for Educational Research, Belgrade, Serbia;

Results of two studies concerning different difficulties of the TIMSS 2011 Grade 4 items in different countries are reported. The first explores differential item functioning (DIF) between Finish, Polish, Slovenian, Croatian and Serbian fourth graders in TIMSS 2011 mathematics assessment. Second study reports on explanations Serbian class teachers give on relative difficulty of selected TIMSS 2011 grade 4 items and their explanations of correct procedures students need to follow to solve selected problems. Sample in the first study was comprised of 22 860 fourth grade students from the five European countries. The 1 PL item response modelling was used for DIF on the 180 math items. Second study involved 20 class teachers in Serbia who were interviewed to provide explanations on relative difficultly of 6 selected TIMSS items, along with accounts on how they instruct students to think of the selected problems. The DIF analyses shows statistically significant difference in the item difficulty for the five countries for 175 out of the 180 items and the five countriesí national curricula to be associated with the differences in the item difficulty. The results of the second study show most common explanations concerning relative difficulty of items include item content, itemís coverage in Serbian classrooms and the language display in each. Teachers differ in the number of parameters included when explaining relative difficulty of an item and the amount of details they provided explaining the correct procedures for individual items.

What is calculation flexibility based on ñ Understanding numbers or strategy repertoire?

Quantitative methods,Student learning,Numeracy,Mathematics,Primary education

Andreas Schulz, University of Education Freiburg, Germany;

There are two competing theoretical models pertaining to calculation flexibility: strategy selection and zeroing-in (Threlfall 2009). Strategy selection is seen as a decision-making process that determines which strategy might suit a given calculation problem more than others. A strategy repertoire, consisting of whole calculation procedures, provides the basis for strategy selection. Conversely, the zeroing-in model relates calculation flexibility with small transformational steps. When a new calculation problem is faced, the numbers in the problem and the relationships between them are considered. Exploratory partial calculations lead to a solution. Understanding numbers and operations provide the basis in the zeroing-in model. In order to determine which of these theoretical models best describes the processes underlying calculation flexibility, I investigated the strategies of 219 children in grade 4 who completed multiplication and division problems. A structural equation model served to evaluate the particular effect of a strategy repertoire versus understanding numbers on calculation flexibility in multiplication and division. For multiplication and for division, the understanding of numbers and operations had a significant impact on flexibility, indicating the validity of the zeroing-in model. In contrast, the strategy repertoire had a significant impact on flexibility for multiplication only. These findings fit with existing research results about calculation flexibility

in addition and subtraction and with the model for strategy discovery by Crowley et al. (1997): Learners develop rudimentary calculation strategies by first drawing upon their understanding of numbers and operations. With increasing experience, learners develop and memorize more complex strategies, resulting in a strategy repertoire.

K 10

28 August 2015 13:45 - 15:15

Room Brown_B5

Paper Presentation

Moral development and religious education

Moral development and religious education

Keywords: Content analysis,Quantitative methods,Morality,Social aspects of learning,Learning in context,Qualitative methods,Organization of educational research(sounds strange),Values education,Primary education,Integrated learning,Assessment methods and tools,Citizenship education,Secondary education,Student learning,Emotion and affect,Goal orientation,Religious studies,Higher education,Motivation and emotion

Sig's: SIG 13 - Moral and Democratic Education,SIG 19 - Religious and Spiritual Education

Chairperson: Age Diseth, University of Bergen , Norway

Actual Practical Value Education in Germany ñ Individual vs. Social Orientation

Content analysis,Quantitative methods,Morality,Social aspects of learning,Learning in context

Birgitta Kopp, Ludwig-Maximilians-University, Germany; Sandra Niedermeier, Ludwig-Maximilians-Universitat (LMU), Germany; Heinz Mandl, Ludwig-Maximilians-Universitat (LMU), Germany;

Value education is a very broad field of study. Thus, the main objective of our research is to get an overview of the practical value education in Germany. Therefore, we investigated 167 projects aiming at value education for children and youths which were launched in Germany in the last five years in different societal levels for socialization. We specifically had a closer look at three issues, namely at the aims of value education in practice, the value topic which was taught, and the implemented measures for value education. We had a closer look at these three issues in different societal levels for socialization aspects of family, day care, school, and youth employment. We particularly looked at the orientation of value education in terms of individual versus social orientation. Results indicate a specific pattern in the practical value education in Germany showing that particularly a social orientation of value education is sought in all three investigated dimensions. This means that the practical value education in Germany activates

interactive discussion and debate about values between individuals to guarantee a reflective and justified cooperation of individuals.

Children reflect on courage

Qualitative methods,Organization of educational research(sounds strange),Morality,Values education,Primary education,Integrated learning

Valentina Mazzoni, University of Verona, Italy; Luigina Mortari, University of Verona, Italy;

Starting from the ìvirtue projectî, the present paper presents some results about courage, in particular some insights about the childrenís understanding of courage. In the ethical perspective, cognitive process (i.e. moral judgment) and practice (i.e. actions) have not to be independent: recognizing an action as virtuous needs to identify a practical choice (action) as well as an understanding of the (moral) judgment existing in such a choice. Considering the example of courage: in order to consider a person a courageous one, we need to know his/her action along with his/her moral judgment. From a empirical research perspective we presented three stories to the children; each story presents a different situation, in which a character performs a courageous act. The we asked to the children to answer to four questions about the thoughts, the consequences and the feeling (moral judgment) they recognize as guiding elements of the courageous act (practice). ìFor me, the guiding thought, that leaded him to act, is to make happy all the animals of the woodî and ìHe felt a deeply ìlightnessî, because he has no more worries and fearsî The results show that not all the children identified courage as the virtue displayed by the protagonist. Despite that, the rage of thoughts, consequences and feelings, recognized by the children as elements of the courageous deliberation, permit to describe an interesting descriptive picture of the childrenís perspective about courage.

Schoolsí influence on adolescentsí conflict styles

Quantitative methods,Assessment methods and tools,Morality,Citizenship education,Secondary education,Learning in context

Hermann J. Abs, University of Duisburg-Essen, Germany; Nina Roczen, German Institute for International Educational Research (DIPF), Germany; Michael Filsecker-Wagner, University of Duisburg-Essen, Germany;

Every day social life is full of sources of conflict among individuals or groups based on different interests, attitudes and/or prejudice against each other. However, the long-term continuation of our democratic societies depends on the competences of their citizens to peacefully resolve conflicts and strive for a reconciliation of interests. Therefore, the question of how schools can help develop adolescents appropriate conflict behavior becomes central. The paper addresses this issue by 1) adapting and validating a measure of adolescentsí conflict style and 2) exploring individual and class-level factors influencing such styles. Results of a confirmatory factor analysis (N=3822 students) indicate that the four-dimensional structure of the conflict style questionnaire (i.e., Integrating, Dominating, Avoiding and Obliging) could be replicated with secondary students. It was also found that studentsí perceived violence predicted a dominating

conflict style at the individual level, while the egalitarian acceptances of teachers, studentsí perceived classroom openness and their participation in training on group work and social learning predicted an integrating conflict style at both levels. Practical and research implications concerning the promotion of constructive conflict behavior in adolescents are discussed.

Theology studentsí personal worldviews in relation to experiences of teaching-learning environment

Student learning,Emotion and affect,Goal orientation,Religious studies,Higher education,Motivation and emotion

Laura Hirsto, University of Eastern Finland, Finland;

The aim of this paper is to investigate Finnish Theology studentsí experiences of the teaching and learning environment provided by their faculty in relation to their personal worldview. Earlier research and various results acquired during a longitudinal research projects about theology studentsí learning and motivational processes support the theoretical idea that religious questions are intertwined in the personal worldviews and values of students, and affect their motivational constructs (e.g. Emmons & Palouzian, 2003; Rauste-von Wright, 1986; Hirsto, 2001, 2012). Earlier phases of the project has shown that students of theology deal with these fundamental questions of spiritual and religious issues in their learning processes before and during their studies, despite the nature of their specific professional orientation (e.g. Hirsto & Tirri, 2009; Hirsto, 2012a; Hirsto, 2012b; Litmanen, Hirsto &Lonka, 2010, Hirsto, 2011). This pilot study was conducted among second year higher education students of theology. Students responded to a questionnaire surveying their experiences of the teaching-learning environment in relation to their own religious or ideological world view and experienced position in the teaching-learning context as part of the majority or minority. The results about the theology studentsí experiences of the religious, spiritual and ideological environment will be reported and analysed in the light of theoretical viewpoints of the personal worldview.

K 11

28 August 2015 13:45 - 15:15

Room Cyan_F1

Paper Presentation

Motivation

Motivation

Keywords: Quantitative methods,Teaching/instruction,Emotion and affect,Secondary education,Motivation and emotion,Qualitative methods,Video analysis,Social interaction,Communities of practice,Social aspects of learning,Social sciences,Student learning,Developmental processes,Interdisciplinary,Learning in context

Sig's: SIG 8 - Motivation and Emotion

Chairperson: Helenrose Fives, Montclair State University, United States

Autonomy-support and controlling teaching: The differential effect according to students' motivation

Quantitative methods,Teaching/instruction,Emotion and affect,Secondary education,Motivation and emotion

Jotie De Meyer, Ghent University, Belgium; Leen Haerens, Ghent University, Belgium; Bart Soenens, Ghent University, Belgium; Maarten Vansteenkiste, Ghent University, Belgium; Nathalie Aelterman, Ghent University, Belgium; Stijn Van Petegem, Ghent University, Belgium;

The present research examined whether, respectively, the beneficial and adverse effects of autonomy-supportive and controlling teaching occur irrespective of studentsí motivational orientation. In Study 1 (N = 95 PE teachers), PE teachersí beliefs about effects of autonomy-supportive and controlling teaching were investigated to see whether teachers believe that the beneficial effects of autonomy-supportive teaching are limited to students with high-quality motivation and whether they believe that at least some students would benefit from controlling teaching. Indeed teachers reported the belief that an autonomy-supportive style works best in autonomously motivated students, while a controlling style works best for controlled motivated students. In Study 2, using an experimental design with video-based vignettes (N = 320 students), we tested whether students actually benefit from a match between their motivation for PE and the teacherís teaching style. Students watching a video displaying an autonomy-supportive teaching style reported more adaptive outcomes than students watching a video displaying a controlling teaching style. The moderating role of student motivation in these effects was limited; suggesting that, in contrast to many teachersí beliefs, even more controlled motivated and amotivated students benefit from an autonomy-supportive approach, while suffering from a controlling approach.

On taking a situative approach to studying studentsí interest: Methodological issues

Qualitative methods,Video analysis,Social interaction,Communities of practice,Motivation and emotion

Niels Dohn, Aarhus University, Denmark;

In this paper, I argue for a situative approach to understanding student interest. I discuss how it is possible methodologically to supply the in-depth context data necessary for understanding the role of social interaction in triggering interest. I suggest a new method which utilizes video recording glasses worn by individual students. This method provides a way of supplying data on in situ first-person perspectives to supplement and triangulate third person in situ observation data and first person retrospective interview data. Preliminary research experience suggests that students wearing video recording glasses tend to forget the in-built camera to a much higher degree than they do a video camera on a stand. It would therefore appear that this method meets

the challenge of disruption of social context better than known methods for collecting data on first person in situ perspectives.

A dimensional and person-centered perspective on defiance as a motivating force in education

Quantitative methods,Teaching/instruction,Social aspects of learning,Social sciences,Secondary education,Motivation and emotion

Nathalie Aelterman, Ghent University, Belgium; Maarten Vansteenkiste, Ghent University, Belgium; Bart Soenens, Ghent University, Belgium; Leen Haerens, Ghent University, Belgium;

Most theories of motivation, including Self-Determination Theory (SDT) focus mainly on studentsí reasons for doing what is requested (e.g., putting effort in the lesson, studying learning material), at the expense of a focus on reasons for not doing what is requested. In terms of underlying reasons of such non-engagement, SDT has focused almost exclusively on amotivation. In an attempt to broaden this perspective, the present study examined the notion of studentsí oppositional defiance, that is, their tendency to not engage in the activity for (externally or internally) pressuring reasons, as an additional motivating force in both physical education (Study 1) and general education (Study 2), thereby relying on a dimensional and person-centered approach. Results of Study 1 indicated that oppositional defiance and amotivation represent distinct types of motivation and that both reasons for not doing what is requested can also be discerned from controlled and autonomous reasons for doing what is requested. In addition, multilevel regression analyses revealed that oppositional defiance yielded unique associations with feelings of resentment toward the learning material and the teacher at the student-level. Finally, person-centered analyses indicated that groups characterized by elevated levels of both oppositional defiance and amotivation displayed the least beneficial pattern of outcomes. As for Study 2, data in the general education context are currently being gathered and will be available for the presentation at the conference. Practical implications and directions for future research will be discussed.

Interest in learning: Re-examining Dewey to consider key notions for contemporary theories

Student learning,Developmental processes,Interdisciplinary,Learning in context,Motivation and emotion

Kimberley Pressick-Kilborn, University of Technology, Sydney, Australia;

As a motivational construct, interest has been considered and examined in educational psychology since the late 19th century (Hidi, Renninger & Krapp. 2004). In his work in the early 20th century, John Dewey emphasised interest as central to educational theory and practice. Deweyís (1913, 1916) theorising of interest in learning provides the starting point for this paper, with an emphasis on interest as active, object-focused and subjective, while being embedded in social contexts rich in personal meaning. The focus then shifts to more recent theorising of interest as situational or individual, a conceptualisation which is dominant in contemporary

research and which presents both synergies with, and significant departures from, Deweyís earlier theory. The paper concludes with consideration of an emerging sociocultural framing of interest, which it is argued returns to, and develops, central aspects of Deweyís theory. A sociocultural approach emphasises the importance of the social context in which interest develops, as well as the dynamic interconnectedness of the situational and individual. Importantly, it also provides some key notions, such as canalisation and self-canalisation (Valsiner, 1997), which can be drawn on to better explain processes of interest development in authentic learning and teaching contexts.

K 12

28 August 2015 13:45 - 15:15

Room Cyan_F2

Paper Presentation

Motivation

Motivation

Keywords: Quantitative methods,Attitudes and beliefs,Developmental processes,Secondary education,Motivation and emotion,Achievement,Goal orientation,Technology,Teacher professional development,Social aspects of learning

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 8 - Motivation and Emotion

Chairperson: Anke Wischgoll, University of Freiburg, Germany

Adolescentsí Math-related Expectancy/Value Beliefs, Career Plans, and Subsequent Career Attainment

Quantitative methods,Attitudes and beliefs,Developmental processes,Secondary education,Motivation and emotion

Fani Lauermann, University of Bonn, Germany; Yi-Miau Tsai , University of Michigan, United States; Jacquelynne S. Eccles, University of California, Irvine, United States;

In this paper, we examine two aspects of expectancy-value theory: the reciprocal associations between adolescentsí expectancy/value beliefs and adolescentsí career plans, and the multiplicative association between expectancies and values in predicting occupational outcomes. In Study 1 (n=360), we found that adolescentsí expectancy and value beliefs about math and adolescentsí math- and science-related career plans predict each other over time. In Study 2 (n=538), we found multiplicative associations between adolescentsí expectancy and value beliefs about math in predicting math-related career attainment approximately 15 years upon graduation from high school. Gender differences in both studies emerged only with regard to career-related

beliefs and not with regard to math as an academic subject: more males than females ended up in math-related careers despite the fact that there were no gender differences in math-related expectancies and values. Implications for theory and practice are discussed.

High school studentsí socio-digital participation profiles: Differences in motivation and well-being

Achievement,Goal orientation,Technology,Secondary education,Motivation and emotion

Lauri Hietajarvi, University of Helsinki, Finland; Heta Tuominen-Soini, University of Helsinki, Finland; Kai Hakkarainen, University of Helsinki, Finland; Katariina Salmela-Aro, Helsinki Collegium for Advanced Studies, Finland; Kirsti Lonka, University of Helsinki, Finland;

The aim of this study was, by utilizing a person-oriented approach, to identify different profiles of high school studentsí socio-digital participation (SDP), and investigate gender differences and their relation to academic motivation and well-being. The participants (1st year, 16-17 years, N=1122) from 16 high schools in Helsinki, Finland, filled in a self-report questionnaire that assessed their socio-digital participation (SDPQ), achievement goal orientations, schoolwork engagement (EDA), and school burnout (SBI). Analyses concerning the structural validity of the measures were conducted using confirmatory factor analysis (CFA). Students with similar patterns of socio-digital participation were identified with latent profile analysis (LPA). As clustering variables we used the eight components of SDPQ. ANOVAs were conducted to examine group and gender differences in relation to academic and emotional functioning. We ended up with four profiles: 1) Basic participators, 2) Gamers, 3) Creative participators, and 4) Active gamers. Girls were more likely to belong to the basic participator and creative participator groups and boys were more likely to be gamers or active gamers. The results regarding the relation of socio-digital participation with academic and emotional functioning revealed, interestingly, that besides gender effect the SDP profile did also appear to have an effect both in student motivation and well-being, in different ways concerning especially those most active in SDP. Could it be that the knowledge practices that are intertwined with the SDP engagement characterizing the groups would differ from those of school, and thus create and non-constructive frictions hindering well-being and motivation?

Maladaptive behavior of students in secondary education and their psychological needs

Quantitative methods,Teacher professional development,Social aspects of learning,Secondary education

Marie Jose Koerhuis, Hogeschool van Amsterdam, Netherlands; Ron Oostdam, Kenniscentrum Domein Onderwijs en Opvoeding, Netherlands; Ruben Fukkink, Domein Onderwijs en Opvoeding, Netherlands;

In this paper results are reported from research among students in three types of secondary education in the Netherlands. The students filled in a questionnaire about four types of maladaptive behavior, and the support they received at school from their teachers and schoolmates to fulfill their need for autonomy, competence and social relatedness. In total 799

second- and third year students of eleven schools and 39 classes participated. The presented research fits in the tradition of selfdetermination theory. Expected was that when students experience the schoolcontext (teachers and schoolmates) is fulfilling the individual needs for autonomy, competence and social relatedness better, less maladaptive behavior is reported. Goal of this research was to find an answer to the following question: 1) What is the difference between the three types of secondary education in the frequency and type of maladaptive behavior and perceived support from their teachers and schoolmates regarding their need for autonomy, competence and social relatedness? 2) to what extend does the perceived support from teachers and schoolmates predict different types of maladaptive behavior? 3) are there differences between boys and girls, and students who feel mainly Dutch or non-Dutch? Multilevel analyses were conducted. Preliminary analyses show differences in frequency of different types of behavior between the three types of secondary education and gives insight in the relative contribution of teachers and schoolmates to the occurrence of maladaptive behavior. Implications for practice and further research will be discussed.

K 13

28 August 2015 13:45 - 15:15

Room Green_A8

Paper Presentation

Research methodology

Research methodology

Keywords: Case studies,Video analysis,Self-regulation,Social interaction,Mathematics,Secondary education,Quantitative methods,Assessment methods and tools,Competencies,Social sciences,Phenomenography,Qualitative methods,Researcher education,Reflection,Interdisciplinary,Learning in context,Meta-analysis,Argumentation

Sig's: SIG 1 - Assessment and Evaluation,SIG 10 - Social Interaction in Learning and Instruction,SIG 26 - Argumentation, Dialogue and Reasoning,SIG 9 - Phenomenography and Variation Theory

Chairperson: Els Boshuizen, Open University, Netherlands

Influence of teacher gaze on student visual attention during teacher's presentation

Case studies,Video analysis,Self-regulation,Social interaction,Mathematics,Secondary education

Markku Hannula, University of Helsinki, Finland; Enrique Garcia Moreno-Esteva, University of Helsinki, Finland; Man Ching Esther Chan, The University of Melbourne, Australia; Miika Toivanen , Finnish Institute of Occupational Health, Finland; David Clarke, University of Melbourne, Australia;

In this research report we shall present results from a pilot study using a mobile gaze tracking device to record studentsí visual attention during mathematics lessons. Our focus in this paper is to explore how a studentís attention is in reaction to the direction of the teacherís gaze. As expected, the studentís attention is more focused on the teacherís face when the teacher is looking towards the class, mostly due to the longer average duration of the attention intervals. We also observe that the studentís attention is more often on the environment when the teacher is looking towards the board.

Competence-based employability: A Rasch analysis

Quantitative methods,Assessment methods and tools,Competencies,Social sciences

Mingyang Liu, University of Toledo, United States; Dominik Froehlich, Maastricht University, Austria;

Due to trends such as increasingly inter-organizational careers, the concept of employability is high on the agenda of employees, employers, and policy makers. To improve our understanding of this concept, we need to understand thoroughly its measurement. We performed a Rasch analysis of Van der Heijde and Van der Heijden's (2006) seminal employability scale to investigate the psychometric properties of the instrument based on a dataset of 167 Austrian employees. The results suggest that the five competences of Van der Heijde and Van der Heijden's (2006) employability scale ñ occupational expertise, anticipation and optimization, personal flexibility, corporate sense, and balance ñ vary in difficulty to agree with. The results suggest a progression of the competences of employability. This view has not been very strong in previous work. The potential interdependence of the dimensions of employability needs further discussion ñ it may be important to consider the employees' current "level" of employability. Empirical researchers need to consider the "level" of employability of the sample. Adding more difficult items to the existing scale will allow to better discriminate between employees of very high levels of employability.

Selfies as a stimulus for reflexivity: Experiencing Veronique, a phenomenological case study

Phenomenography,Qualitative methods,Researcher education,Reflection,Interdisciplinary,Learning in context

Joy deVries, University of Amsterdam, Netherlands; Nigel King, University of Huddersfield, United Kingdom; Tim Dornan, Queen's University Belfast, United Kingdom; Esther Helmich, University of Amsterdam, Netherlands; Martina Ann Kelly, University of Calgary, Canada;

Reflexivity is inherent to qualitative research. Yet the process of ëdoingí reflexivity is often vague. Traditionally it is presented as an individual process, primarily dependent on textual data e.g. reflexive diary. Increasingly qualitative research is performed by teams, of different disciplines. Additionally qualitative methodologies are extending to embrace visual and performative data. We share our experiences as an international multidisciplinary team working together reflexively. We suggest a potential role for Selfies, self-portraits taken using a mobile

device, as a technical device to stimulate this process. Our study involved phenomenological analysis of the lived experience of being a medical student. Data comprised longitudinal interviews, taken 1 year apart, which we exemplify in our analysis of a single participant, Veronique. We present a series of Selfies, taken in settings that related to ëVeroniqueísí world as described in her interviews, and used these to challenge preconceptions of our research participant and her environment. We report how Selfies helped us ëconnectí in an embodied way with our participant, how we ëacted intoí her life, using our imagination and emotions, and finally how we ëmerged-withí our respondent to generate new meaning. The process transformed our research experience and enriched our analysis. We reflect on how selfies facilitated this process, drawing on ideas of Mezirow, Gadamer and Foucault. We suggest that in addition to the performative nature of selfies and use of imaginative play, the process of taking selfies is an embodied process which enabled us to engage empathically and physically with our research participant, Veronique

When researchers orient their gaze: Three case studies on argumentation and cognition

Meta-analysis,Researcher education,Argumentation,Interdisciplinary,Learning in context

Kristine Lund, University of Lyon, France; Matthieu Quignard, CNRS, France;

There is a tension concerning the role of theory in two epistemological traditions in the human sciences. In the first, researchers make hypotheses about theoretical constructs and data is gathered specifically in order to test the predictions arising from hypotheses. In the second, theory arises empirically from the analysis of data. Our goal is to show that researchers working in the first tradition are exposed to pitfalls arising from theorizing before analysis. A retrospective analysis of our own work showed how we avoided those pitfalls while illustrating methodological insights on argumentation and cognition. In conclusion, we propose to further reflect on the role of theory in research on education as the tensions between epistemological traditions can hinder interdisciplinary work.

K 14

28 August 2015 13:45 - 15:15

Room Green_A4

Paper Presentation

School effectiveness

School effectiveness

Keywords: Quantitative methods,School effectiveness,Cognitive development,Language (L1/Standard Language),Mathematics,Primary education,Language (Foreign and second),Higher education,Peer interaction,Experimental studies,Educational policy,At-risk students

Sig's: SIG 18 - Educational Effectiveness,SIG 23 - Educational Evaluation, Accountability and School Improvement

Chairperson: Wolfram Rollett, University of Education Freiburg , Germany

Teacher Effects on Childrenís Achievement Growth: A Cross-Classified Accelerated Growth Model

Quantitative methods,School effectiveness,Cognitive development,Language (L1/Standard Language),Mathematics,Primary education

Lars-Erik Malmberg, University of Oxford, United Kingdom; Lorena Ortega, University of Oxford, United Kingdom; Pamela Sammons, University of Oxford, United Kingdom;

The present study investigates teacher effects on student achievement growth in Chile, an emerging country with a socially stratified and segregated schooling system and an unregulated and diverse teacher labour force. The studyís data sets were obtained by linking data from Chilean assessment programs and administrative records and feature an accelerated longitudinal design comprising participants in 4 overlapping cohorts, together spanning Grades 3 to 8 (N = 11,403 students in 157 schools). In order to address the research aims of the study, and appropriately account for the complex structure of the data, accelerated longitudinal designs, growth curve approaches and cross-classified models are applied in combination. The magnitudes of school and teacher effects are estimated using a contextual value-added approach. Results confirm that both, school and teacher effects, are larger than those found in industrialised countries, teacher effects exceed school effects, and educational effects are larger when achievement progress over time, rather than achievement status, is studied.

Effects of (foreign) language competences on educational transitions

Quantitative methods,School effectiveness,Language (Foreign and second),Language (L1/Standard Language),Higher education

Maleika Kruger, School of Teacher Education PH FHNW Basel, Switzerland; Dominique Oesch, School of Teacher Education PH FHNW Basel, Switzerland; Stefan Keller, School of Teacher Education Basel, Switzerland; Albert Dueggeli, University of Applied Sciences and Arts Northwestern Switzerland PH (FHNW), Switzerland;

The transition from compulsory to higher education is a key decision in studentsí learning biographies. This paper investigates the relationship between school requirements at post-secondary level and leanersí abilities in foreign languages. This question is relevant because foreign languages are a highly relevant aspect of an educational system and carry great relevance in determining learnersí choices concerning higher education, or the chances they might be given within an educational system. We distinguished types of schools (vocational vs. academic), and levels of schools (high, middle and low certifications according to ISCED). Regarding the levels of certifications, we postulated that higher competences in English and French would lead to educational levels with higher certifications. Regarding the types of schools we performed an

explorative analysis of our data, including competences in foreign languages as determining factors. We used a sub-sample of the international study TIDES (Transitions in Different Educational Systems, N = 968). Our preliminary findings show that it is the competences in French which best predict the level of schooling chosen by learners (controlling for effects of origin and of gender). Learners with high competences in French tend to choose schools with high certifications. When looking at types of schooling (i.e. academic vs. vocational), it is learnersí competences in English which have the highest predictive power, together with school language (German) and gender. Be believe that these findings open up a paradigm of research investigating the relationship between language competences and educational transitions.

School and classroom factors affecting bullying

Quantitative methods,School effectiveness,Peer interaction,Primary education

Daniel Muijs, University of Southampton, United Kingdom;

Educational effectiveness research has frequently been criticised for a lack of attention to non-cognitive outcomes. Bullying, as both a persistent and highly harmful phenomenon in schools, is one such outcome that presents us with an important test of educational effects. In this study we used a quantitative research design combining data from pupil and teacher surveys in 35 primary schools (n=1514), with secondary data from the Ministry of Education and the national inspectorate to look at school- and classroom-level predictors of bullying prevalence. Results from multilevel models of the data showed that the school level explained 15.2% of variance in bullying behaviours, with the classroom level explaining 14.7%. Bullying was not related to social background or ethnicity, but was related to gender. At the school level, school location and school size were not significantly related to rates of bullying. Significant school level factors were found to be cultural, behavioural, pedagogical, and, to a far lesser extent, structural. These findings affirm that school and classroom factors may affect non-cognitive as well as cognitive outcomes, and suggests that a number of malleable school-level conditions may positively impact on bullying behaviours.

Using the Dynamic Approach to School Improvement to Promote Equity in Socially Disadvantaged Schools

Experimental studies,Educational policy,School effectiveness,At-risk students,Primary education

Evi Charalambous, University of Cyprus, Cyprus; Leonidas Kyriakides, University of Cyprus, Cyprus; Bert (Hubertus P M) Creemers, University of Groningen / GION, Netherlands;

This paper argues for the use of a dynamic approach to school improvement (DASI) and its main features and steps are presented. The paper also refers to a study investigating the extent to which DASI can promote quality and equity in schools with low socioeconomic status (SES). A sample of 40 primary schools was selected and randomly split into two groups. All schools received feedback on the quality of their policy for teaching and their learning environment. Schools of the control group were encouraged to develop their own action plans to promote student learning outcomes. The research team provided support to schools of the experimental

group to made use of DASI in identifying their improvement priorities, developing and implementing their action plans, and establishing mechanisms to monitor the implementation of their action plans, To investigate the impact of DASI on promoting quality, student achievement in mathematics at the beginning and at the end of a school year was measured. Using multilevel modelling techniques, it was found that schools which made use of DASI managed to promote student learning outcomes more than schools which formed the control group. To investigate the impact of DASI on equity, we measured the impact of SES on student achievement. By running separate multilevel analyses, it was found out that in the schools of the experimental group the effect of SES on final student achievement was smaller. Implications of findings for promoting quality and equity in education are drawn and suggestions for further research are provided.

K 15

28 August 2015 13:45 - 15:15

Room Brown_B7

Paper Presentation

School effectiveness

School effectiveness

Keywords: Qualitative methods,School effectiveness,Social sciences,Primary education,Experimental studies,Quantitative methods,Teacher professional development,Teaching/instruction,Parental involvement in learning,Educational policy,Achievement

Sig's: SIG 18 - Educational Effectiveness,SIG 23 - Educational Evaluation, Accountability and School Improvement

Chairperson: Pamela Sammons, University of Oxford, United Kingdom

Teachersí decision for grade retention: Data-based or intuition-driven?

Qualitative methods,School effectiveness,Social sciences,Primary education

Kristin Vanlommel, University of Antwerp, Belgium; Jan Vanhoof, University of Antwerp, Belgium; Peter Van Petegem, University of Antwerp, Belgium;

Teachers possess extensive decision-making autonomy in important areas and they remain the prime arbiters to decide whether or not pupils can promote to a subsequent grade. The quality of teachersí decisions is of high importance, yet little is known about the way they make these decisions. This study sets out to explore the decision-making processes of teachers concerning grade retention and tries to describe and explain the extent to which these are data based. Data were gathered through semi-structured interviews with 17 teachers in primary education. Results

show that teachers primarily define a problem based on their intuition. The main driver to search for data is to underpin their intuition and to establish an evidence base from an accountability perspective. These results are promising to gain insight in the decision-making processes of teachers and will help to define how the quality of the decisions within schools can be optimized.

The Impact of a Three-year INSET Course on Improving Teaching Based on the Dynamic Approach

Experimental studies,Quantitative methods,School effectiveness,Teacher professional development,Teaching/instruction

Leonidas Kyriakides, University of Cyprus, Cyprus; Anastasia Panayiotou, University of Cyprus, Cyprus; Margarita Christoforidou, Cyprus International Institute of Management, Cyprus;

This paper advocates for the use of the Dynamic Approach (DA) to teacher professional development which is based on research findings revealing that the teacher factors of the dynamic model of educational effectiveness can be classified into stages of teaching, structured in a developmental order and associated with student outcomes. Thus, teacher professional development should be differentiated to meet the needs and priorities of teachers at each stage. The paper also refers to studies which show that one-year courses based on DA can have a significant effect on improving teaching and assessment skills. The study reported here investigates the impact that a long term program based on DA can have on quality of teaching. A sample of 106 teachers was randomly allocated into two groups: one experimental group which received a professional development program based on the DA for three consecutive years and one control group. Teaching skills were measured at the beginning of the intervention and at the end of each year. Teachers employing the DA improved their skills during each year the intervention was offered but no change in the teaching skills of the control group was observed. By using multilevel modelling techniques, it was found that the intervention was equally effective for teachers situated at different stages. However, a non-linear relation in the progress made by the teachers situated at the higher stages was identified. Strengths and limitations of using the DA to promote quality of teaching are discussed and suggestions for further research are provided.

The teacher and home learning environment effects on student achievement gains in mathematics

Quantitative methods,School effectiveness,Teaching/instruction,Parental involvement in learning

Andria Dimosthenous, University of Cyprus, Cyprus;

This study investigates the effect of home learning environment on student achievement in mathematics at the beginning and at the end of grade 1, and on the learning progress that students made during their first year at primary school. The study also investigates the extent to which teacher factors included in the dynamic model of educational effectiveness have differential effects on different groups of students based on their home learning environment. Specifically, 24 primary schools of Cyprus were randomly selected and all students of grade 1 (n=855)

participated in this study. External forms of assessment were used to measure student achievement in mathematics at the beginning and at the end of grade 1. A questionnaire measuring the home learning environment was administered to parents of the student sample at the beginning of grade 1. For each teacher, three observations of his/her behaviour in the classroom were conducted. Using multilevel modelling techniques, it was found that beyond the socio-economic status of the family, the home learning materials and the learning opportunities offered to children at home explain variation of student achievement at the beginning and at the end of grade 1. Factors measuring teacher behaviour in the classroom were also found to explain variation in student achievement gains irrespective of classroom contextual factors including the home learning environment of students within a class. Suggestions for further research are provided.

Effects of Interim Assessments on Student Achievement

Experimental studies,Quantitative methods,Educational policy,School effectiveness,Achievement

Spyros Konstantopoulos, Michigan State University, United States; Wei LI, Michigan State University, United States; Shazia Miller, American Institutes for Research, United States; Arie van der Ploeg, American Institutes for Research, United States;

Interim assessments are increasingly common in U.S. schools. We used high quality data from a large-scale school-level cluster randomized experiment that took place in the state of Indiana in the U.S. in 2010-2011 to examine the impact of two well-known commercial interim assessment programs (mCLASS and Acuity) on mathematics and reading achievement. We used two-level models to analyze the data. Results indicate that the treatment effects in grades 3-8 are close to zero and not statistically significant. The treatment effects in lower grades (i.e., kindergarten to second grade) were negative, significant and at least one-fifth of a standard deviation. Overall, it appears that mCLASS had a negative impact on student achievement in early grades and that Acuity had not impact on student achievement in grades 3-8.

K 16

28 August 2015 13:45 - 15:15

Room Blue1_C1

Paper Presentation

Science education

Science education

Keywords: Experimental studies,Reflective society,Reasoning,Citizenship education,Science education,Informal learning,Conversation/ Discourse analysis,Qualitative methods,Peer interaction,Secondary education,Inquiry learning,Mixed-method research,Educational

technology,Physical Sciences,Primary education,Computer-assisted learning,Case studies,Literacy,Social sciences

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 13 - Moral and Democratic Education,SIG 7 - Learning and Instruction with Computers

Chairperson: Richard Hamilton, University of Auckland, New Zealand

The effect of ethical concerns on source evaluation and argumentation about a socio-scientific issue

Experimental studies,Reflective society,Reasoning,Citizenship education,Science education,Informal learning

Friederike Hendriks, University of Muenster, Germany; Dorothe Kienhues, University of Munster, Germany; Rainer Bromme, Universitat Munster, Germany;

In two experimental studies we investigated whether different sources of a disclosure, pointing out ethical concerns regarding a socio-scientific issue, influence the perceived trustworthiness of a science blogger differently (on the dimensions expertise, integrity, and benevolence). In the first study, participants read a scientistís blog entry on a neuro-enhancing medication, followed by a disclosure of ethical concerns, either by the blogger himself (self-disclosure) or by another scientist (external-disclosure). A third group did not receive ethical concerns (no-disclosure). Planned contrasts revealed that ratings of the bloggerís benevolence were lower when ethical aspects were disclosed (no matter by whom) compared to no-disclosure, but that self-disclosure of ethical concerns resulted in higher ratings of benevolence than external-disclosure. The second study applied the same study design, except one group received a preceding unsourced disclosure of the same ethical concerns (unsourced-disclosure group) instead of no-disclosure. Planned contrasts revealed no difference between the unsourced-disclosure and the external-disclosure group. However, a self-disclosure had positive effects on assessed benevolence compared to unsourced-disclosure. Results imply that a disclosure of ethical concerns will raise vigilance about an expertís benevolence, although a self-disclosure might prevent such vigilance in part. Educational implications will be discussed.

Analysing Studentsí Peer Discussionsí Quality While Collaborating and Using External Representations

Conversation/ Discourse analysis,Qualitative methods,Peer interaction,Science education,Secondary education,Inquiry learning

Jouni Viiri, University of Jyvaskyla, Finland; Antti Lehtinen, University of Jyvaskyla, Finland;

Peer discussions in science classes have unique benefits for the studentsí learning and for taking ownership of their own learning. Still studies have shown that the quality of talk in peer discussions is low and sometimes focused on off-task phenomena. The use of external representations like drawings has been argued to enhance studentsí idea generation and nego-

tiations. Our study focused on upper secondary school studentsí (n = 46) peer discussions drawing. A three-part taxonomy was used for the analysis with disputational talk, cumulative talk and exploratory talk being the talk types. Exploratory talk is linked with improvements in individual non-verbal reasoning test scores. iPads were used for the drawing and for the data collection. Most of the talk was cumulative with the atmosphere being supportive but uncriti-cal. There was very little disputational talk. Under half of the groups used exploratory talk with uncertainty on how to represent an abstract concept being a catalyst for opening up the discussion. This is promising considering the benefits of exploratory talk.

Do physical and virtual manipulatives affect studentsí learning in a different way?

Mixed-method research,Educational technology,Physical Sciences,Science education,Primary education,Computer-assisted learning

Marios Michael, University of Cyprus, Cyprus; Zacharias Zacharia, University of Cyprus, Cyprus;

In this study we aimed to examine the effect of experimenting with Physical Manipulatives (PM), Virtual Manipulatives (VM), and a blended combination of PM and VM on primary school studentsí understanding of concepts in the domain of Electric Circuits and whether any possible differences relate to the actions/processes that students engage in during PM or VM experimentation. A pre-post comparison study design was used for the purposes of this study that involved 55 participants assigned to three conditions (condition PM: 18 students; condition VM: 18 students; condition PM&VM: 19 students). For blending VM and PM, we used a framework from prior research, whose primary criterion for selecting VM or PM was based on whether it provides an advantage/affordance that the other medium of experimentation (PM or VM) cannot provide. All conditions used the same inquiry-oriented curriculum materials and procedures. A conceptual test was administered to assess studentsí understanding before and after the intervention. Process-related and discourse data were derived from video data. Results revealed that the use of the blended combinations enhanced studentsí conceptual understanding in the domain of Electric Circuits more than the use of PM or VM alone. Differences in the effect emerged because only the blended combination was carrying both of PMís and VMís advantageous affordances. Specifically, the video data showed that VM allowed setting-up a circuit faster, repeating an experiment easier and spending a more productive discourse time, whereas PM supported students in developing the psychomotor skills needed for setting-up a physical circuit in real life.

Batman, Spiderman & City of Ember: Literacies & Science Fiction in Education

Case studies,Literacy,Science education,Social sciences

Charalambos Vrasidas, CARDET - University of Nicosia , Cyprus; CARDET Team, CARDET, Cyprus; Maria Solomou, Cyprus University of Technology, Cyprus;

The purpose of this paper is to present the framework and findings from the Science Fiction in Education project, which is a two-year long Comenius Lifelong Learning action focusing on

improving engagement with literacies, science and technology, by providing teachers with tools, training, and guidance that will assist them in enhancing their teaching, making science more attractive to students, connecting it with real-life issues such as the environment, and providing girls and other marginalised groups with access to science. The central project idea is to achieve this by incorporating Science Fiction in interdisciplinary teaching and learning. During this presentation we will discuss findings from the implementation of interdisciplinary units in 4 primary classrooms.

K 17

28 August 2015 13:45 - 15:15

Room Blue2_D1

Paper Presentation

Social interaction in L&I

Social interaction in L&I and culture and education

Keywords: Ethnography,Student learning,Competencies,Social interaction,Primary education,Mixed-method research,Teaching/instruction,Secondary education,Cultural diversity in school,Attitudes and beliefs,Interdisciplinary,Motivation and emotion,Qualitative methods

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 11 - Teaching and Teacher Education,SIG 21 - Learning and Teaching in Culturally Diverse Settings

Chairperson: Stefanie Brimmers, TU Dortmund University, Germany

îAm I uncertain or excellent?î ñ Pupilsí perceptions of a formal class test

Ethnography,Student learning,Competencies,Social interaction,Primary education

Kati Kasanen, University of Eastern Finland, Finland; Hannu Raty, University of Eastern Finland, Finland;

The class test is one of the important and self-evident school practices which construct and convey to the pupils the predominant conception of ability represented by the school. In a previous study we focused on first-gradersí tests and the way the class test was taught to the children. In the present study the ethnographic research focused on one third-grade classís test situations in the mother tongue and mathematics during one school year. The purpose of this presentation is to describe and analyse the test situations such as they appeared in the functioning of the school: for example, what sorts of elements are used to construct the class test, how the pupils act in the test situations, and especially, what feelings and thoughts does it provoke among them? Our analyses suggest that the third-graders no longer see the test practices as objects of learning but rather as a familiar part of their everyday schoolwork. The test situations manifest

themselves as ëreal testsí: the evaluative import is clear and practices have been mastered, but preparation for the test still needs to be practised. The findings of the study will be discussed with special reference to the ways in which the class test constructs the selective-restrictive sphere of education.

Teachersí keywords and clues: Contribution to the study of classroom interactions

Mixed-method research,Student learning,Teaching/instruction,Social interaction,Secondary education

Jean-Philippe Maitre, Labex ASLAN - UMR ICAR, France;

Despite several approaches and many researches, studies of classroom interactions have mostly taken interest in short time spans of teaching for each class observed (from minutes to a couple of hours). And yet, learning is certainly grounded in longer durations. In our contribution, we will describe the method we are developing to work on larger data set. It is based on the hypothesis that mere analyses of uses of certain terms by the teacher ñ keywords and clues ñ may bear insights about what the teacher supposes the students know. Through video recordings and interviews, we test this hypothesis at first on two hours of teaching of 13 science teachers. 70% of the teachersí suppositions are predicted from the terms they use. The results are encouraging enough to use the method in two exploratory studies. From qualitative and quantitative analyses of use of keywords and clues, we come to grasp teachersí choices regarding the management of the class heterogeneity, and aspects of studentsí comprehension of the keywords. From these further results, we discuss our methodís potential to deal with longer observations of classroom interactions.

Adolescent Self-confidence, and School Belonging in New Zealand: Does School Context Matter?

Mixed-method research,Cultural diversity in school,Attitudes and beliefs,Interdisciplinary,Secondary education,Motivation and emotion

Penelope Watson, The University of Auckland, New Zealand; Christine Rubie-Davies, University of Auckland, New Zealand;

School belonging has been positively associated with academic achievement, and marginalized groups have risked lowered school belonging. Individuals who transgress stereotypical conceptions of gender have risked marginalization, and such a scenario holds extra implication for adolescence when the need to belong is heightened. Research has revealed that gender-norm conformity, gender self-confidence (GSC), and school activity choice were associated, but no study has explored the relationship between GSC and school belonging. The current study employed a new inventory (comprising qualitative and quantitative scales) to investigate associations between notions of gender, GSC, and school belonging, in single sex and coeducational New Zealand adolescent school settings. The qualitative data indicated participantsí personal perceptions of masculinity and femininity aligned strongly with stereotypical gender norms. Further, the quantitative data disclosed that participants were most

comfortable with their personal definition of gender when it was related to stereotypical expectations of gender norms. Importantly, positive correlations between GSC and school belonging variables (e.g., relatedness, behavioural engagement, feelings toward teachers, and general goal orientation), indicated that school belonging was likely to be greater when participants registered higher levels of GSC. Differences were found for school setting, and participant gender and ethnicity: correlations between GSC and school belonging variables were highest for the single sex female participants, particularly those who were Maori or Pacific Islanders. The findings of the study expand research about school belonging, and draw attention to the importance for scholastic futures, of supporting diversity in adolescent gender identity.

Learning from challenges - Teachers' stories of turnaround in relationships with students

Qualitative methods,Teaching/instruction,Social interaction,Primary education,Secondary education,Motivation and emotion

Anneli Frelin, University of Gavle, Sweden; Anna Rytivaara, University of Tampere, Finland;

The aim of this paper is to explore how contradictions and tensions evolve in teachers' stories of their students with whom they experience challenging yet rewarding relationships. 87 teachers were asked about students who caused trouble and also about students who gave them joy over the last school year. Out of the ten who described the same student as both causing much trouble and giving joy the five most challenging stories were selected for narrative analysis of content and structure. Students were described with negative as well as positive characteristics, and their problems were narrated as located outside of the student. Teachers positioned themselves as positive and caring adults, and worked with other adults to turn the situations around. The presented conceptualizations from the stories can help teachers reconsider challenging students and manage such situations better.

K 18

28 August 2015 13:45 - 15:15

Room Brown_B3

Paper Presentation

Teacher professional development

Teacher professional development

Keywords: In-service teacher education,Pre-service teacher education,Parental involvement in learning,Vocational education,Mixed-method research,Teacher professional development,Social aspects of learning,Mathematics,Communities of practice,Quantitative methods,Teaching/instruction,Competencies,Social sciences,Workplace learning,Video analysis,Reflection,Professions and applied sciences,Cooperative/collaborative learning

Sig's: SIG 11 - Teaching and Teacher Education,SIG 14 - Learning and Professional Development

Chairperson: Madeleine Bieg, University of Konstanz, Germany

Teachersí parent communication skills: Latent classes and relationships to workplace behaviors

In-service teacher education,Pre-service teacher education,Parental involvement in learning,Vocational education

Martin Gartmeier, Technische Universitat Munchen (TUM), Germany; Markus Gebhardt, TU Munchen, Germany;

Despite communication with parents is an important task for teachers, many report being stressed by this aspect of their work. Drawing upon the Munich Model of Communication Competence, we measured this competence in a German sample of teachers (N=677) from various schools in order to get insight into its status quo. Beyond that, we sought to investigate relationships between this competence and teachersí workplace behaviors, namely the degree to which they talk with colleagues about their work with parents and the time they actually spend on talking to parents. We used data from the German PISA 2012 field trial study. Communication competence was measured with nine questionnaire items. Two free-text items measured the time-related variables. Firstly, through a latent class analysis, we identified four skill-level groups of teachers. 24% showed good, 52% showed medium to low self-confidence in their communication skills. An interesting fourth group (24%) showed an unusual pattern with a strong focus on pragmatic problem solving in communication with parents. The classes differed also in the extent of their exchange with colleagues. No relationships were found in the time spent on talking to parents. Our results show that, despite communication is a key aspect of the profession of teachers, many donít feel very competent in this area. This is disappointing, also because our results show that higher levels of communication skills relate to teachersí work behavior, e.g. in the extent they talk to colleagues. This shows that teachers should be qualified better in the area of communication skills.

Exploration of a professional learning network through the communities of practice framework

Mixed-method research,Teacher professional development,Social aspects of learning,Mathematics,Communities of practice

Gyeong Mi Heo, McGill University, Canada; Alain Breuleux, McGill University, Canada;

The Creating, Collaborating, and Computing in Mathematics (CCC-M) project is based on a design-based research approach to design and develop a professional learning network (PLN) for increasing teachers' capacity to integrate technology into their teaching and learning mathematics, in particular with a focus on the transition between elementary and secondary school. We apply a conceptual framework of communities of practice (CoP) to explore how the

PLN functions and how it combines all three elements of domain, community, and practice. Hence, this paper will introduce the CCC-M project, investigate the PLN in Year 1 (2013-2014) by using the CoP framework, and present strategies for Year 2 (2014-2015) to further develop the PLN in terms of the CoP perspectives.

Identifying causes for teachersí judgment inaccuracy with an MTMM-CFA model

Quantitative methods,Teacher professional development,Teaching/instruction,Competencies,Social sciences,Workplace learning

Anna-Katharina Praetorius, German Institute for International Educational Research (DIPF), Germany; Tobias Koch, Freie Universitat Berlin, Germany; Annette Scheunpflug, University of Bamberg, Germany; Horst Zeinz, University of Munster, Germany; Markus Dresel, University of Augsburg, Germany;

A number of studies have shown that teachersí judgments of studentsí motivational characteristics often differ considerably from studentsí self-reports. Little is known about why these deviations occur. The aim of the study at hand was to identify how relevant, relative to each other, three groups of teacher characteristics ñ individual teacher characteristics (e.g., job experience), characteristics of the teaching context (e.g., school climate), characteristics of student-teacher interaction (e.g., sympathy) ñ are for explaining teachersí judgment (in)accuracy. Judgments by 225 teachers regarding the academic self-concepts and the academic interests of 2643 students were analyzed using a Multi-Trait-Multi-Method-CFA (MTMM-CFA) model suited for cross-classified data (see Koch et al., 2014). The results showed that the numerically largest source of method variance was due to student-teacher interaction effects. This indicates that explaining teachersí judgment inaccuracy is more complex than originally assumed since the individual configuration between teacher and student is more relevant for teachersí judgment inaccuracy than pure teacher characteristics.

Long-term effects of teacher peer coaching with video

Video analysis,Teacher professional development,Reflection,Professions and applied sciences,Workplace learning,Cooperative/collaborative learning

Niels Brouwer, Radboud University Nijmegen, Netherlands;

The study reported in this paper was aimed at evaluating long-term effects of experienced teachersí participation in a four-year peer coaching project in which they used digital video to record, analyse, discuss and improve their teaching. In-depth follow-up interviews with a representative sample of participants three to six years after participation indicate that peer coaching with digital video as a strategy for professional development has potential not only for introducing changes in teacher behaviour, but also for consolidating and integrating them in work routines in the longer term. Factors in the person, the peer coaching intervention and the work environment are identified which can promote or hinder these outcomes.

28 August 2015 13:45 - 15:15

Room Green_A3

Paper Presentation

Technology-enhanced learning

Technology-enhanced learning

Keywords: Quantitative methods,Teacher professional development,Social interaction,Social sciences,Workplace learning,Communities of learners,Phenomenography,Reflection,E-learning/ Online learning,Lifelong learning,Comparative studies,Instructional design,Reasoning,Primary education,Game-based learning,Experimental studies,Learning analytics,Educational technology,Teaching/instruction,Computer-supported collaborative learning

Sig's: SIG 14 - Learning and Professional Development,SIG 20 - Computer Supported Inquiry Learning,SIG 7 - Learning and Instruction with Computers,SIG 9 - Phenomenography and Variation Theory

Chairperson: Raija Hamalainen, University of Jyvaskyla, Finland

Tweeting Teachers ñ Does Social Capital play a Role in Twitter Conversations among Teachers?

Quantitative methods,Teacher professional development,Social interaction,Social sciences,Workplace learning,Communities of learners

Martin Rehm, University of Duisburg-Essen, Germany; Michael Kerres, University Duisburg-Essen, Germany;

Teachers are increasingly expected to engage into ongoing professional development, in order to ensure the continued provision of high quality education. In this context, social networking sites (SNS) provide them with an environment, where they can collaboratively acquire and share new information within diverse groups of people. In this context, social capital theory has been proposed as valuable perspective to analyze the exchange of information within SNS. Yet, past studies remain inconclusive about the role of social capital. Furthermore, little is known about whether and how teachers use SNS to share and collect information. The present study addresses these shortcomings by providing empirical evidence from the two hashtag conversations on Twitter, namely #edchat and #edchatde. Using a multi-method approach, we conducted a social networks analysis (SNA) to assess the underlying structure of the conversations. Additionally, we constructed a 2-Mode Network to identify whether individuals shared a code during their conversations. Our results indicate that Twitter provides teachers with an environment to actively acquire and share information. Moreover, we show the existence of dominant subgroups, which are driven by either individuals, or online (commercial) portals. Finally, the results of our 2-mode network analysis provide preliminary evidence for a shared code that is developed among

teachers using Twitter. Our study thereby contributes to the discussion about social capital within SNS and provides tentative evidence on how differing ìinvestment behaviorî among users can lead to different payoffs in terms of social capital within SNS.

Reflexive parental learning on a mobile learning platform for the economically disadvantaged

Phenomenography,Reflection,E-learning/ Online learning,Lifelong learning

Luis Go, The University of Hong Kong, Hong Kong; Ming Fai Pang, University of Hong Kong, China;

A phenomenographic study in Hong Kong found six hierarchically related conceptions of parental learning amongst parents enrolled in courses for parents learning to be better parents; these were learning as (a.) recalling experiences, (b.) acquiring problem solving skills, (c.) applying the problem solving skills, (d.) recognizing a new parent-child relationship, (e.) gaining another understanding of parenthood, and (f.) changing parenting attitude and practice. The first three, focused on the control of childrenís behavior, were associated with surface learning, and the last three, focused on the development of the parent-child relationship, and the meaning of parenting, with deep learning (Go, 2013). A recent parental learning scheme integrated the case study methodology, case study moderation by parent education practitioners, and peer learning discussion groups on a mobile phone application platform to make parent education accessible to parents from economically disadvantaged families. This mobile learning platform incorporated pedagogical techniques that facilitates reflexive learning. This mobile learning platform also allows parent education practitioners and researchers to monitor the learning of parents. Using the framework proposed by research on conceptions of parental learning (Go & Pang, in progress), this study aimed to evaluate the learning of parents in this new and innovative learning platform. Through phenomenographic interviews with the participants and parent education practitioners, and through the analyses of transcriptions of the interventions in the case discussion modules, the study found parent learners acquiring and adapting increasingly deep and reflexive learning approaches over the progression of the program.

Internet-based development of thinking skills in young schoolchildren

Comparative studies,Quantitative methods,Instructional design,Reasoning,Primary education,Game-based learning

Gyongyver Molnar, University of Szeged, Hungary; Andras Lorincz, Eotvos Lorand University, Hungary; Attila Pasztor, University of Szeged, Hungary; Beno Csapo, University of Szeged, Hungary;

In this paper we compare face-to-face and Internet-based development of inductive reasoning under various conditions and research designs to compare the efficacy of using the same training tasks in various gaming environments. In the first, computer-based scenario, children were able to communicate with each other and share their opinions. In the second case, they were only able to ask a supervisor. In the third case, the playful training material was embedded in a Pac-Man-

like frame game. The fourth situation included avatar-based feedback as well. The samples for the study were drawn from children in Years 1 and 2 (Nexp_FF=90, Nexp_CB=121, Ncontrol=128). The effectiveness of the training was measured with an inductive reasoning test (Cronbachís ?=.84).The main structure of the training was based on Klauerís model of inductive reasoning. Results indicated that both face-to-face and computer-based training environments increased participantsí learning outcomes by more than one standard deviation. The effect size for the training in comparison with the performance of the control groups was d=1.2 (p.01) in the face-to-face environment and d=.9 (p.01) in the computer-based setting. The training was more effective for children with lower skills if they had the opportunity to discuss any problems arising during the training and/or if the training tasks were embedded in an extra motivating frame game environment. The research results and analyses confirmed the premise that inductive reasoning skills can significantly and effectively develop in a gaming environment between the ages of 6 and 8 independent of the scenarios used.

Learning analytics: Theoretical mechanisms and first empirical results

Experimental studies,Learning analytics,Educational technology,Teaching/instruction,Computer-supported collaborative learning

Anouschka van Leeuwen, Utrecht University, Netherlands; Jeroen Janssen, Utrecht University, Netherlands; Gijsbert Erkens, Utrecht University, Netherlands; Mieke Brekelmans, Utrecht University, Netherlands;

Teachers increasingly use computer-supported learning (CSCL) in their classrooms to facilitate collaboration among students. It can be a challenge for the teacher to keep up with all student activities. Learning analytics (LA) tools, which offer summaries, visualizations, and analyses of student data, can help to decrease the teacherís effort to maintain an overview. The goal of this paper is to highlight the two mechanisms by which LA tools may support teachers and to pinpoint the considerations that should be kept in mind when implementing LA in classroom situations. The first mechanism is that LA tools can lower teachersí cognitive load by summarizing activities or by making processes visible that would otherwise require diagnosis of student activities at multiple time points. The second mechanism is that LA tools can steer teachersí focus. By showing information about a particular aspect of student activities, the teacher is more likely to pay attention to this aspect. For both mechanism, it is important to keep in mind teachersí beliefs about what are important characteristics of good collaboration. Otherwise, the beneficial effect of LA tools may be counterfeited. Our findings are of theoretical as well as practical relevance. Theoretically, we provide insights into the working of LA tools to support teachers. Practically, we provide concrete considerations to take into account when implementing LA in educational settings.

K 20

28 August 2015 13:45 - 15:15

Room Blue2_D2

Paper Presentation

Technology-enhanced learning

Technology-enhanced learning

Keywords: Quantitative methods,Educational technology,Educational attainment,Science education,Primary education,Computer-assisted learning,Qualitative methods,Assessment methods and tools,Motivation and emotion,Emotion and affect,Technology,Inquiry learning,Learning analytics

Sig's: SIG 20 - Computer Supported Inquiry Learning,SIG 21 - Learning and Teaching in Culturally Diverse Settings,SIG 7 - Learning and Instruction with Computers

Chairperson: Kalliopi Benetos, University of Geneva, Switzerland

Can a multilingual digital learning environment serve as a stepping stone for knowledge acquisition?

Quantitative methods,Educational technology,Educational attainment,Science education,Primary education,Computer-assisted learning

Evelien Van Laere, Ghent University, Belgium; Johan van Braak, Ghent University, Belgium;

As todayís schools are characterized by a growing linguistic diversity among their students, traditional bilingual education programs become less feasible. However, computer-based learning environments (CBLEs) offer potential to realize multilingual education through supporting studentsí acquisition of challenging knowledge via authentic language support. An intervention study was set up with 1429 fifth-grade students in 61 schools to test the multilingual CBLE E-Validiv. In this CBLE, the same content regarding environmental sciences is offered in the language of instruction (i.e. Dutch) and one of six other languages (i.e. English, French, Italian, Polish, Spanish, or Turkish). For students having another home language than the language of instruction, the other language is set to their home language. Throughout the CBLE, students can switch between the two languages via a language switch button. The project group got access to the content of E-Validiv in the language of instruction and one chosen other language; the placebo group only got access to the content in the language of instruction; the control group did not work with E-Validiv. Multilevel hierarchical regression analyses show that students in project schools achieve similar results as students in control schools with regard to science achievement. As a consequence, the attention given to other languages does not impair the process of domain-specific knowledge acquisition. Moreover, boys attain a higher level in science achievement, just as students from families with a higher SES and students who are stronger in logical thinking, reading comprehension, and prior performance in science subjects.

Capturing learnersí engagement and learning in an educational games: An eye tracking study

Qualitative methods,Quantitative methods,Assessment methods and tools,Educational technology,Motivation and emotion

Michael Filsecker, University of Duisburg-Essen, Germany;

This study examined how individualsí perception of the task (i.e., play to learn or for fun) influences their engagement in the educational game Genius Unternehmen Physik and its impact on learning. The study used eye tracking technology and other sources of data (i.e., interviews and surveys) to capture individualsí engagement while playing the game. Participants were 42 college students who played the game for 30 minutes. Students instructed to play to learn were assumed to show a deeper cognitive engagement and increased learning than students instructed to play for fun. Between-subject comparisons of participantsí cognitive engagement and learning did partially showed the expected differences. Likewise, behavioral engagement (i.e., Fixation duration and reading depth) were higher in the condition to learn. Finally, reading depth showed a positive correlation with learning outcomes. The paper illustrated the challenges of capturing engagement in such interactive environments and the implications for the concept of engagement and its assessment possibilities.

The elusive concept of immersion for learning: A review of the prevalent theoretical models

Educational technology,Emotion and affect,Technology,Computer-assisted learning,Inquiry learning,Motivation and emotion

Yiannis Georgiou, Cyprus University of Technology, Cyprus; Eleni Kyza, Cyprus University of Technology, Cyprus;

Immersion is a popular concept in the field of digital games and virtual reality, but an understudied construct in research related to technology-mediated learning environments. This issue is further exacerbated since, even though immersion is a widely-used term, it is usually employed by designers, researchers or educators in unspecified or contradictory ways. These definitional tensions surrounding the concept add a greater complexity to current efforts to decipher the impact of immersion on studentsí learning. In this theoretical contribution, we reviewed 15 prevalent, theoretical models for immersion derived from the fields of virtual and augmented reality, digital games, narrative and education, in an attempt to identify the tensions surrounding the definition of immersion. The analysis of the theoretical models highlighted three main definitional tensions: (a) The subjective or objective nature of immersion, (b) Whether immersion is dependent or independent from the technology in which it is reified, and (c) Whether immersion should be perceived as an optimal state or on a continuum. The analysis of the models supports the argument that the prevalent definition is that immersion is a subjective psychological phenomenon, not technologically dependent, and represents a continuum of engagement which could result in the optimum states of flow and presence. Given the debate in how to define immersion and the lack of studies on the relationship between immersion and learning, we argue that more research should be invested on defining and operationalizing the construct as this relates to student learning and the design of theory-informed learning environments.

Learning Analytics in a data-rich context: The most informative data for feedback generation

Learning analytics,Quantitative methods,Educational technology,Computer-assisted learning

Dirk Tempelaar, Maastricht University , Netherlands; Bart Rienties, Open University UK, Institute of Educational Technology, United Kingdom; Bas Giesbers, Rotterdam School of Management, Netherlands;

Learning analytics seek to enhance the learning processes through systematic measurements of learning related data and to provide informative feedback to learners and educators. Track data from Learning Management Systems (LMS) constitute a main data source for learning analytics. This empirical contribution provides an application of Buckingham Shum and Deakin Crickís theoretical framework of dispositional learning analytics: an infrastructure that combines learning dispositions data with data extracted from computer-assisted, formative assessments and LMSs. In a large introductory quantitative methods module, 922 students were enrolled in a module based on principles of blended learning, combining face-to-face Problem-Based Learning sessions with e-tutorials. Dispositional data is taken from a broad range of self-report instruments, including learning strategies, regulation strategies, goal setting, academic motivation, and engagement. We investigated the predictive power of learning dispositions, outcomes of continuous formative assessments and other system generated data in modelling student performance and their potential to generate informative feedback. Using a dynamic, longitudinal perspective, computer-assisted formative assessments seem to be the best predictor for detecting underperforming students and academic performance, while basic LMS data did not substantially predict learning. If timely feedback is crucial, both use-intensity related track data from e-tutorial systems, and learning dispositions, are valuable sources for feedback generation.

K 21

28 August 2015 13:45 - 15:15

Room Orange_E1

Paper Presentation

Writing

Writing

Keywords: Quantitative methods,Assessment methods and tools,Literacy,Writing/Literacy,Secondary education,Experimental studies,Student learning,Developmental processes,Primary education,Second language acquisition,Qualitative methods,Teaching/instruction,Language (L1/Standard Language)

Sig's: SIG 12 - Writing

Chairperson: Peter Davies, University of Birmingham, United Kingdom

Longitudinal developments in the reliability of task-based writing assessment

Quantitative methods,Assessment methods and tools,Literacy,Writing/Literacy,Secondary education

Roel van Steensel, Erasmus University Rotterdam, Netherlands; Ron Oostdam, University of Amsterdam, Netherlands; Amos Van Gelderen, University of Amsterdam, Netherlands;

Writing proficiency can be assessed via task-based performance assessments, that aim to test learnersí proficiencies in communicative situations resembling natural situations. The reliability of such assessments is affected importantly by the variance associated with tasks. The effects of task variance can take two forms: Tasks can vary in difficulty (referred to as main task effects) and students can be rank-ordered differently across different tasks (person x task effects). In this contribution we analyze such effects longitudinally, by examining the writing scores of 89 low achieving students in prevocational secondary education across Grades 7 to 9. The students were administered the SALT-Writing, a task-based writing assessment including three writing tasks in different genres (narrative, argumentative, instructive), at the end of each school year. Test scores were analyzed using G(eneralizability) Theory analysis, an extension of classical test theory which allows to disentangle the various error sources affecting test reliability. G Theory analyses for each occasion separately showed large contributions to measurement error by both person x task effects, the size of which remained more or less stable over time, and main task effects, particularly in Grade 9. An analysis including the scores of all three occasions showed that much error variance was accounted for by main task effects. Person x task effects and person x occasion x task effects also made (equally) substantial contributions to error variance. Our findings have implications for decisions about the construction of tests for (longitudinal) writing assessments.

To tell it, to write it? The development of narrative competence from kindergarten to second grade

Experimental studies,Quantitative methods,Student learning,Developmental processes,Literacy,Primary education

Giuliana Pinto, University of Florence, Italy; Lucia Bigozzi, University of Florence, Italy; Christian Tarchi, University of Florence, Italy;

The relationship between oral language and the writing process in narratives, especially at early acquisition stages, and the ways the former can enhance/limit the latter has not been researched heavily. In a three-year longitudinal study, the predictive relationship between kindergartener oral narrative competence with and 1st and 2nd grader written narrative competence was explored. For 1st and 2nd graders, the relationship between spelling and narrative competence in written productions was also analysed. 109 Italian children participated in this study. Kindergarteners produced an oral narrative while 1st and 2nd graders produced a written narrative. Oral and written narratives were analysed in terms of structure, cohesion, and

coherence. 1st grade spelling skills assessed through a dictation task. Multiple linear regression and mediational analyses were performed. Kindergarten oral narrative competence directly influenced 2nd written narrative competence, and 1st grade written narrative competence via a mediational effect of spelling. Results suggest the importance of practicing oral narrative competence in kindergarten and in the 1st grade, and the value of composition quality independent from orthographic text accuracy.

Writing skills of native Italian children and second-language learners: A study in primary school

Second language acquisition,Literacy,Writing/Literacy,Primary education

Carmen Gelati, University of Milano Bicocca, Italy; Federica Durante, University of Milano-Bicocca, Italy; Grazia Maestri, University of Milano-Bicocca, Italy;

Writing is a demanding task that involves many cognitive processes (Hayes & Flower, 1980). As reported in the literature, writing is even more complex for second-language learners, who have more difficulties in spelling and text composition (e.g., Kormos, 2011). This study aimed to analyze the following: a) the differences between native speakers and second-language learners in Italian primary schools, b) the specific writing skills affected, and c) the role of motivation, which, as research has shown (e.g., Pajares & Valiante, 2006), influences performance. A longitudinal study was conducted with third and fifth graders. Tasks and standardized tests were administered at the beginning and at the end of the school year to measure participantsí self-perception of their writing competence, handwriting fluency, spelling, sentence construction, and text production (length, sentence complexity, quality, correctness and structure). Repeated measures ANOVA and MANOVA were performed. Italian children perceived themselves as more competent and achieved higher in spelling and sentence construction; moreover, they wrote texts with higher quality, correctness, and more complex sentences, independently of their grade. Although the performance of second-language learners also improved, the gap between this group and the native speakers persisted at the end of the school year. A regression analysis also showed that participantsí self-perception of their writing competence predicted the text quality. These results indicate that instructional interventions focused on the identified difficulties and motivation to write are necessary for second-language learners.

The role of grammar instruction in developing metalinguistic reflection in adolescent writers

Qualitative methods,Teaching/instruction,Literacy,Language (L1/Standard Language),Writing/Literacy,Secondary education

Annabel Watson, University of Exeter, United Kingdom;

This paper discusses one strand of an intervention study designed to investigate the impact of explicit contextualised grammar instruction on the reading and writing development of adolescent learners. It builds on the work of Myhill (2011) in adopting an interdisciplinary approach which draws together linguistic and psychological conceptions of metalinguistics,

examining how studentsí metalinguistic understandings are articulated in writing and interviews. The qualitative strand reported here uses interviews with twelve students which elicited metalinguistic reflection: these were analysed to explore the types of metalinguistic activity demonstrated, the role of metalinguistic terminology in supporting reflection, and the relationship between reflections on texts written by the students and those written by others. A sample of 24 pre and post intervention reading tests was also coded for incidence and types of metalinguistic terminology and commentary, and these were compared to test scores to relate demonstrated metalinguistic understanding to success in the tests. The findings foreground the interrelationship of reading and writing: showing that students developed metalinguistic understandings which could transfer across reading and writing activities. They indicate the value of lexical and syntactic metalinguistic terminology in supporting metapragmatic reflection, and by exploring moments of insecure but developing understanding, they also reveal some of the trajectories which students can follow as their ability to express metalinguistic understanding grows. The study offers a significant contribution to the ìgrammar debateî (Locke 2010) by illuminating the way in which explicit grammar instruction can develop student facility with language by fostering metalinguistic reflection.

K 22

28 August 2015 13:45 - 15:15

Room Brown_B6

Paper Presentation

Assessment methods and tools

Assessment methods and tools

Keywords: Artificial intelligence,Assessment methods and tools,Problem solving,Computer-supported collaborative learning,Cognitive skills,Reasoning,Knowledge creation,Mixed-method research,Qualitative methods,Quantitative methods,Student learning,Conceptual change,Social sciences,Higher education

Sig's: SIG 1 - Assessment and Evaluation,SIG 13 - Moral and Democratic Education,SIG 4 - Higher Education

Chairperson: Bridget Dever, Lehigh University, United States

Assessing Collaborative Problem Solving Skills through Computer and Human Agents

Artificial intelligence,Assessment methods and tools,Problem solving,Computer-supported collaborative learning

Rosen Yigal, Pearson, United States;

Today, proficiency in collaborative problem solving (CPS) is necessary for success in both college and workplace, as well as the ability to perform that collaboration in various settings. Structuring computer-based assessment for collaborative problem solving (CPS), specifically for large-scale programs, is challenging. In order to perform standardized assessment of CPS skills on an individual level, each student should be matched with various types of group members, should be tested on a variety of CPS skills, and must apply the skills in varied contexts. The aim of this study was to explore studentsí performance in human-to-agent (H-A), compared to human-to-human (H-H) CPS assessment tasks. This study is among the first of its kind to investigate systematically studentsí CPS performance in H-A and H-H standardized assessment settings.

Assessing Critical Thinking through Thinking Tools

Assessment methods and tools,Cognitive skills,Problem solving,Reasoning,Knowledge creation

Rosen Yigal, Pearson, United States;

A concept map is a graphical tool for representing knowledge structure in a form of a graph whose nodes represent concepts, and arcs between nodes correspond to interrelations between them. Using concept map engages students in a variety of critical and complex thinking, such as evaluating, analyzing, and decision making. Although the potential use of concept maps to assess studentsí knowledge has been recognized, concept maps are traditionally used as instructional tools. The chapter introduces interactive three-phase Evidence-Centered Concept Map (ECCM) designed to empower the student to analyze claims and supporting evidence on a topic and to draw evidence-based conclusion in online critical thinking assessments. Directions future studies are discussed in terms of their implications to technology tools in large-scale critical thinking assessment programs.

Constructing and validating a new scale for measuring faculty incivility

Mixed-method research,Qualitative methods,Quantitative methods,Student learning

Yariv Itzkovich, Ashkelon Academic College, Israel; Dorit Alt, Kinneret College on the Sea of Galilee, Israel;

This study was aimed at mapping features of actual faculty incivility (FI) as perceived by students, constructing and validating a new scale for measuring those features. In order to achieve these goals, a mix method approach was implemented. A qualitative method was used to capture and analyze FI as described by college students. The results foregrounded four categories: (1) Passive FI towards a group of students, (2) passive FI towards an individual (3) active FI towards a group of students, and (4) active FI towards an individual. The students' descriptions were formulated as short items. A quantitative method was used to validate the developed questionnaire (Perceived Faculty Incivility Scale [PFIS]) by using structural equation modeling. The scale was submitted to 744 undergraduate college students. A confirmatory factor analysis has revealed only two dimensions of passive and active FI. Implications of these findings and directions for future research are discussed.

Assessment Task Based on Concept Map with Errors to Foster Pedagogic Resonance in Higher Education

Quantitative methods,Assessment methods and tools,Conceptual change,Social sciences,Higher education

Paulo Correia, University of Sao Paulo, Brazil; Joana Aguiar, University of Sao Paulo, Brazil;

Concept maps (Cmaps) are useful to represent studentsí declarative knowledge. Assessment tasks are usually based on learner-generated Cmaps; however, students must be trained in the concept mapping technique. The aim of this study was to investigate an assessment task based on a Cmap with errors prepared by the teacher. A 2X2 experimental design was conducted with graduate students (n = 14) considering two variables: studentsí level of declarative knowledge (High [HDK] and Low [LDK]) and Cmap type (With Error [WE] or Without Error [NE]). A 31-statement Likert questionnaire was developed to assess the studentsí declarative knowledge and validate the results obtained using the assessment task with Cmap. The results showed a strong positive correlation between the questionnaire and Cmap assessment task (rho = .717 $p < 0.01$). HDK students outperformed LDK in both conditions (WE and NE). The assessment task, based on Cmap WE, was useful to assess studentsí declarative knowledge and allow teacher to determine specific conceptual obstacles to be overcome by each student. This innovative approach fosters pedagogic resonance in higher education (i.e., bridge between teacher knowledge and student learning) because the teacher can (i) select the conceptual errors to add to the Cmap, (ii) discuss errors with the students, and (iii) provide specific guidance according to performance on the assessment task (errors found and comments provided to correct them).

K 23

28 August 2015 13:45 - 15:15

Room Purple_H4

Paper Presentation

Assessment methods and tools

Assessment methods and tools

Keywords: Assessment methods and tools,Teacher professional development,Higher education,Primary education,Secondary education,School effectiveness,Mathematics,Quantitative methods,Achievement,Language (L1/Standard Language),Writing/Literacy,Psychometrics,Student learning

Sig's: SIG 1 - Assessment and Evaluation,SIG 7 - Learning and Instruction with Computers

Chairperson: George Michaeloudes, University of Cyprus, Cyprus

Teachersí reasons for using peer assessment: A survey self-report of Spanish teachers

Assessment methods and tools,Teacher professional development,Higher education,Primary education,Secondary education

Ernesto Panadero, Universidad Autonoma de Madrid, Spain; Gavin Brown, The University of Auckland, New Zealand;

Peer assessment (PA) is one of the central principles of formative assessment and assessment for learning (AfL) fields. There is ample empirical evidence as to the benefits for studentsí learning of implementing AfL principles However, there is still need to understand factors impacting the real classroom applications of AfL principles such as PA. To explore this matter, over 1500 primary, secondary and higher education teachers completed a survey covering PA as well as other aspects of formative assessment, with 751 teachers providing complete responses to items related to PA. Confirmatory factor analysis and structural equation modeling were used to examine relationships of attitudes and beliefs to self-reported use of PA. Teachers reported occasional use of PA in their classrooms and had positive experience with PA. The vast majority did not use anonymous forms of PA and half of the teachers considered the students were accurate when assessing peers. The main problem teachers identified with PA was that students did not rely on the scores given by classmates, while the main advantage was that students were more responsible for their learning. The study indicates there are tensions in PA usage which might be resolved using anonymous PA and criteria-based tools (e.g. rubrics).

What counts most for Studentsí Learning? Comparing traditional Home Resources and Digital Resources

Assessment methods and tools,School effectiveness,Mathematics,Primary education

Mario Vennemann, University of Paderborn, Germany; Birgit Eickelmann, Paderborn University, Germany;

Empirical large-scale assessments of the last forty years have shown that economic, cultural and social capital has a substantial impact on studentsí academic achievement. In recent years, a wide variety of instruments has been developed to measure the extent of studentsí disparities accounting for classical cultural resources. Based on TIMSS 2011 data from 37 countries, the proposed paper extends this approach by integrating new technologies in an index in a more straightforward manner. The paper develops a Home Digital Resources (HDR) scale comprising the access to and possession of information and communication technologies (ICT) as cultural capital in the 21st century and evaluates its impact on studentsí mathematics achievement. Using IRT technology, calibration is conducted via weighted likelihood estimation.

Spelling out assessment: The development and testing of an innovative tool

Quantitative methods,Assessment methods and tools,Achievement,Language (L1/Standard Language),Writing/Literacy,Primary education

Tessa Daffern, Charles Sturt University, Australia;

Stage theories of spelling development have been widely accepted since their conception in the 1970s; but, converging evidence offers support for non-linear models of spelling development. Specifically, Triple Word Form Theory (TWFT) indicates that students are capable of drawing on and coordinating phonological, orthographic, and morphological skills from quite early in their spelling development. Assumptions about the nature of spelling development have important implications for the way spelling is taught; however, many existing assessment systems currently being applied by educators and systems have failed to consider non-linear perspectives of spelling development. This paper presents the Components of Spelling Test (CoST) as a new approach to spelling assessment. The test is a valid and reliable assessment tool informed by TWFT and developed through a method of analysis suggested by stage theorists. Data used to develop and test the CoST were drawn from students in Year 3 and Year 5 across four schools in the Australian Capital Territory (ACT) (n=198). The results of the testing clearly demonstrated that the CoST can provide teachers and educational researchers with a means to validly and reliably identify individual differences in specific phonological, orthographic and morphological skills associated with spelling.

Validation of the Student Engagement Instrument in Finnish junior high school

Psychometrics,Quantitative methods,Student learning,Secondary education

Tuomo Virtanen , University of Jyvaskyla, Finland; Noona Kiuru, University of Jyvaskyla, Finland; Marja-Kristiina Lerkkanen, University of Jyvaskyla, Finland; Anna-Maija Poikkeus, University of Jyvaskyla, Finland; Matti Kuorelahti, University of Jyvaskyla, Finland;

The aim of the study was to examine the applicability and psychometric properties of the Student Engagement Instrument (SEI; Appleton, Christenson, Kim, & Reschly, 2006) among Finnish junior high school students (N = 2,485). The Finnish SEI (SEI-F) showed good item and scale reliabilities. Except for three items, the confirmatory factor analysis results confirmed the expected five-factor structure. The factor structure was also replicated with both the random half of the validation data and the data collected from another junior high school student sample (N = 821). In addition, evidence for concurrent validity was provided in analyses of student-reported academic performance, school burnout, self-esteem, and engaged behavior when controlling studentsí gender and grade level. The findings indicate that the SEI-F is a sound measure to assess Finnish junior high school studentsí affective and cognitive engagement.

K 24

28 August 2015 13:45 - 15:15

Room Brown_B8

Paper Presentation

Assessment methods and tools

Assessment methods and tools

Keywords: Video analysis,Assessment methods and tools,Social aspects of learning,Vocational education,Computer-supported collaborative learning,Quantitative methods,Competencies,Technology,Secondary education,Lifelong learning,Reflection,Writing/Literacy,Workplace learning

Sig's: SIG 1 - Assessment and Evaluation,SIG 17 - Qualitative and Quantitative Approaches to Learning and Instruction

Chairperson: Johanna Kaiser, University of Kiel, Germany

ToT and SocComp-two new manuals to rate studentsí learning behavior in the context of video analysis

Video analysis,Assessment methods and tools,Social aspects of learning,Vocational education,Computer-supported collaborative learning

Antonia Scholkmann, University of Hamburg, Germany; Michel Knigge, Martin-Luther-University Halle-Wittenberg, Germany; Jens Siemon, University of Hamburg, Germany;

Video analyses have developed as a state of the artís tool to assess the quality of learning. However, current studies and manuals put a strong focus on the teachersí actions, which then are evaluated with respect to their contribution to the explanation of differences in the quality of academic learning. Studentsí behaviors and actions on the other hand have not been subject to intensive video study activities yet, but are desirable to research, especially in the context of peer-oriented and inquiry-based learning processes. The present paper presents two new manuals for video-analysis that focus upon studentsí behaviors in instructional situations. The first scale, Time on Task (ToT) allows for documentation of the amount of on-topic behavior (as opposed to off-topic and organizational activities) and uses a low-inference coding scheme. The second scale, Socially Competent Behavior (SocComp) focuses on studentís adequate use of eye contact, voice and language and length of verbal utterances and represents a more high-inference rating. Both scales were piloted on a set of 24 hours of video taped material from three classes in the field vocational education. Subjects were students that participated in an online-based self-directed situated learning scenario. Fourteen independent raters coded the behaviors of n=60 students working together on a task, with a result of >.9,000 parallel codings for ToT and >. 800 parallel codlings for SocComp. Results of intercoder-reliability-analyses show that both scales are highly reliable, however the high-inference rating on SocComp proves to be more sensitive to disturbances in the coding process.

Construct Validation through Manipulation of Item Difficulties in a Simulation-based ICT-Skills Test

Quantitative methods,Assessment methods and tools,Competencies,Technology,Secondary education,Lifelong learning

Lena Engelhardt, The German Institute for International Educational Research (DIPF), Germany; Frank Goldhammer, German Institute for International Educational Research (DIPF), Centre for International Student Assessment (ZIB), Germany; Johannes Naumann, Goethe University Frankfurt, Germany; Andreas Frey, Friedrich Schiller University Jena, Germany; Katja Hartig, Goethe-University Frankfurt, Germany; Holger Horz, Goethe-University Frankfurt, Institute of Psychology, Germany; Kathrin Kuchta, Goethe University Frankfurt, Germany; S. Franziska C. Wenzel, Friedrich Schiller University Jena, Germany;

Dealing with ICT in a competent way is a prerequisite to be successful in personal, educational and also professional life and thus an important goal in education. However, the gap in ICT competence shifts from physical access to differences in cognitive ICT-Skills. Therefore, a behavior-based test was developed to measure all daily ICT-Skills of 15 year old students. Since behavior-based items are complex in nature and it is not always clear where the difficulties in items come from, construct validity of the simulation-based items was assessed. Already implemented items were modified in two ways. If these modifications have an effect on the probability to solve item, this can be seen as a proof of validity regarding the interpretation of test scores. The first modification addressed the stimulus. Theoretically derived demands were systematically modified with the aim to change item difficulty but not the measured construct. The second modification addressed the instruction. Solution steps were added to eliminate ICT-specific demands in order to reduce item difficulty and change the measured construct. This modification was used to assess impact of ICT-specific and general task demands in original items compared to items with eliminated demands. These findings support construct validity and can be used for item construction and adoption.

New methods to trace knowledge in small and incomplete texts of learners. Two validation-studies

Quantitative methods,Assessment methods and tools,Reflection,Writing/Literacy

Pablo Pirnay-Dummer, Martin-Luther-Universitat Halle-Wittenberg, Germany;

A local semantic trace is a certain quasi-propositional structure that can still be reconstructed from written content that is incomplete or does not follow a proper grammar. It can also retrace bits of knowledge from text that contains only very few words, making the microstructure of such artifacts of knowledge externalization available to automated analysis. The methodology is built to track knowledge and understanding in contexts that contain such small pieces of speech, like discussion boards, chats, forums. In this paper, the methodology is introduced and cross-validated by two studies with a total of N=310 text samples against already existing methods. The results show a very promising outlook for three levels of expertise and five completely different domains.

Employeesí patterns of behavior change after training: A cluster analysis

Quantitative methods,Assessment methods and tools,Workplace learning,Lifelong learning

Carla Quesada-Pallares, University of Leeds, United Kingdom; Eduardo C. Cascallar, University of Leuven, Belgium;

The instability of the labor market along with decreasing investment of organizations in the training of their employees emphasizes the need for workers who can adapt and successfully transfer their learning to the workplace. The Model to Predict Transfer (Quesada-Pallares, 2014) evaluates transfer of learning from a motivational perspective, explaining 60.9% of the variance of 'intention to transfer'. The aim of this paper is to identify possible patterns in the determinants of the transfer in workers who participated in training. Using an ex post facto prospective design with intentional sampling (n = 204), the Initial Transfer Intention questionnaire (t1) was administered before the training, as well as the Transfer questionnaire (t2) which was administered three months after training. Cluster analysis along with post-hoc analyses established the presence of three different groups (k = 3), indicating that there are significant differences in the factor means between persons of Cluster #1 and persons of Cluster #3. Results allowed us to establish specific patterns among people with low levels of transfer. Implications of these results are discussed.

L 1

28 August 2015 15:45 - 17:15

Room Blue2_D1

ICT Demonstrations

Technology-enhanced learning

Thesis Writer: Supporting writing processes in real time using a web-based digital learning platform

Keywords: Educational technology,Language (L1/Standard Language),Writing/Literacy,E-learning/ Online learning,Higher education,Computer-assisted learning

Sig's: SIG 12 - Writing

Chairperson: Christian Rapp, Zurich University of Applied Sciences, Switzerland

Thesis Writer: Supporting writing processes in real time using a web-based digital learning platform

Educational technology,Language (L1/Standard Language),Writing/Literacy,E-learning/ Online learning,Higher education,Computer-assisted learning

Jennifer Erlemann, ZHAW School of Management and Law, Switzerland; Madalina Chitez, Language Competence Centre, Switzerland; Otto Kruse, Zurich University of Applied Sciences,

Switzerland; Jakob Ott, Center For Innovative Teaching And Learning, Switzerland; Christian Rapp, Zurich University of Applied Sciences, Switzerland;

Thesis Writer is a newly created online learning environment, supporting students in mastering the various organizational, cognitive, social and linguistic demands of thesis writing. Users of Thesis Writer are offered tutorials and organizational aids to anticipate, prepare, plan and write their theses. Conceptually, Thesis Writer has been designed in such a way to initiate self-governed and self-organized learning processes, coupled with peer and tutored feedback, if required. Discipline-specific support can be provided when Thesis Writer is integrated into a particular degree program. New tools have been created to support the formulation process by integrating large discipline-specific corpora from which users can derive linguistic support through an integrated IMS Corpus Work Bench. The demonstration will offer insights into the construction principles and will allow participants to try out the functionality of the main tools. So far, Thesis Writer has been tested by a limited number of individuals, but preparations for use within study programs are now under way. Languages available on Thesis Writer are English and German, but others may subsequently be added. It is hoped that Thesis Writer will help optimize one of the most demanding learning processes by guiding students through the challenging task of creating their first extended scientific or scholarly paper.

L 2

28 August 2015 15:45 - 17:15

Room Green_A8

ICT Demonstrations

Inquiry learning

Designing inquiry learning spaces for online labs in the Go-Lab platform

Keywords: Science education,Technology,Secondary education,Computer-assisted learning,Inquiry learning

Sig's: SIG 20 - Computer Supported Inquiry Learning

Chairperson: Ton de Jong, University of Twente, Netherlands

Designing inquiry learning spaces for online labs in the Go-Lab platform

Science education,Technology,Secondary education,Computer-assisted learning,Inquiry learning

Ton de Jong, University of Twente, Netherlands; Denis Gillet, EPFL, Switzerland; Sofoklis Sotiriou, Ellinogermaniki Agogi, Greece; Zacharias Zacharia, University of Cyprus, Cyprus;

The Go-Lab project (http://www.go-lab-project.eu/) aims to enable the integration of online labs through inquiry-based learning approaches into science classrooms. Through the use of an advanced plug and play technological solution the Go-Lab project opens up remote science laboratories, data archives, and virtual labs (together ìonline labsî) for large-scale use in real educational settings. Currently, the Go-Lab federation of online labs (www.golabz.eu) houses more than 50 labs from a variety of science fields. This number will grow rapidly in the near future. In this ICT demonstration we will show how the federation of online labs is organized, how with the Go-Lab authoring tools researchers, designers and educators/teachers can through a process of drag and drop and assembly easily create full inquiry learning environments that include specific Go-Lab scaffolds for each phase of the inquiry cycle, and the tools we developed to create a Go-Lab teacher community. Go-Lab is completely web-based and if internet connections at the spot allow there will be hands-on experience for the participants of the workshop.

L 3

28 August 2015 15:45 - 17:15

Room Cyan_F2

ICT Demonstrations

Assessment methods and tools

Flexible and Secure Online Exam Environments for Authentic, Competence-Oriented E-Assessments

Keywords: Assessment methods and tools,Educational technology,Higher education,Communities of practice

Sig's: SIG 1 - Assessment and Evaluation

Chairperson: Tobias Halbherr, Swiss Federal Institute of Technology Zurich // ETH Zurich, Switzerland

Flexible and Secure Online Exam Environments for Authentic, Competence-Oriented E-Assessments

Assessment methods and tools,Educational technology,Higher education,Communities of practice

Tobias Halbherr, Swiss Federal Institute of Technology Zurich // ETH Zurich, Switzerland; Kai Reuter, ETH Zurich, Switzerland; Daniel Schneider, ETH Zurich, Switzerland; Thomas Piendl, ETH Zurich, Switzerland;

Over the past two years ETH Zurich has developed, piloted, and put into operation secure and flexible environments for authentic computer based assessments. The environments are based on a combination of Safe Exam Browser (SEB) and Virtual Desktop Infrastructure (VDI). This architecture provides technical safeguards that effectively prevent fraud by locking down any means of communication or access to resources which are not explicitly permitted, while at the same time granting access to resources that are. The environments may use centrally managed university computers or even student devices as exam clients. These environments thus open up the possibility to grant students access to contemporary IT-tools such as software, files, networks or even the Internet in the context of high-stakes examinations, thus opening up altogether new possibilities in examination task design. Such exam environments are particularly promising in the context of recent calls to emphasize examination authenticity and competence-orientation. Put succinctly: it is one thing to assess engineering studentsí knowledge and understanding of machine part design in a paper-pencil examination, and quite another to actually let them model machine parts with the corresponding software tools. In this ICT demonstration we will present the underlying architecture of these exam environments and provide live demonstrations of various exemplary use-cases. The demonstration ends with a discussion of the implications and opportunities for examination practice these new environments entail.

L 4

28 August 2015 15:45 - 17:15

Room Purple_H2

Workshops

Teacher professional development

The C.A.R.E. Mentoring Model: Experiencing a reflective synergy

Keywords: Qualitative methods,Teacher professional development,Reflection,Language (Foreign and second),Workplace learning,Cooperative/collaborative learning

Sig's: SIG 11 - Teaching and Teacher Education

Chairperson: Niki Christodoulou, University of Nicosia, Cyprus

The C.A.R.E. Mentoring Model: Experiencing a reflective synergy

Qualitative methods,Teacher professional development,Reflection,Language (Foreign and second),Workplace learning,Cooperative/collaborative learning

Niki Christodoulou, University of Nicosia, Cyprus;

The capacity to reflect on practice is considered integral to pre-service, in-service teacher education, teacher learning and development. Despite its value, however, reflection has received

criticisms due to its multifaceted and often elusive nature. More specifically, in the field of English Language Teaching (ELT) there is a lack of specific descriptions of how reflection is operationalised. Such critical review of RP calls for a more evidence-based and data-led description of the value of reflection, its processes and outcomes so that the reflective process can become more concrete and helpful for practitioners. One of the ways through which the RP process can be facilitated and operationalised in the fields of ELT and teacher development is evolutionary mentoring. Within the context of a recently completed doctoral study in a private university in Cyprus, five in-service English as a Foreign Language (EFL) teachers and the researcher engaged in a systematic operationalisation of RP through reflective journals, reflective inquiry group meetings, dialogue-observation sessions based on video-recordings, online chats, and holistic interviews. From the study emerged the Collaborative, Appreciative, Reflective Enquiry (CARE) model for teacher development, revealing new understandings and insights for the operationalisation of RP in the Teaching of English as a Foreign Language (TEFL). The workshop will introduce participants to the components of the CARE model and the evolutionary mentoring process entailed in the model. Additionally, participants will have the opportunity to engage in reflective journaling and subsequently experience reflective mentoring by taking the roles of both mentor and mentee interchangeably.

L 5

28 August 2015 15:45 - 17:15

Room Yellow_G1

Workshops

Assessment methods and tools

Using IRT for standard setting in performance based assessments

Keywords: Psychometrics,Quantitative methods,Assessment methods and tools,Achievement,Competencies

Sig's: SIG 1 - Assessment and Evaluation

Chairperson: Boaz Shulruf, University of New South Wales, Australia

Using IRT for standard setting in performance based assessments

Psychometrics,Quantitative methods,Assessment methods and tools,Achievement,Competencies

Boaz Shulruf, University of New South Wales, Australia;

Item Response Theory (IRT) and related models are complex statistical techniques, commonly utilise the information in tests to estimate person and items parameters. In particular most IRT models are used for improving test and item quality with limited application in standard setting.

This workshop demonstrates how the Rasch model could be used for standard setting in performance based assessments including the advantages and limitations of this approach. The Rasch Borderline Method (RBM) presented in this workshop and its underlying principles enable psychometricians to make defensible pass/fail decisions when examiners fail doing so and provide only indecisive borderline marks. The workshop includes theoretical discussion, practical guideline for using the RBM and related models, presentations of results from simulation studies and critical appraisal of the RBM in comparison to other standard setting methods.

L 6

28 August 2015 15:45 - 17:15

Room Orange_E1

Workshops

Research methodology

How to conduct qualitative evidence synthesis: case study in meta-ethnography

Keywords: Meta-analysis,Qualitative methods,Researcher education,Conceptual change,Interdisciplinary,Knowledge creation

Sig's: SIG 17 - Qualitative and Quantitative Approaches to Learning and Instruction

Chairperson: Martina Ann Kelly, University of Calgary, Canada

How to conduct qualitative evidence synthesis: Case study in meta-ethnography

Meta-analysis,Qualitative methods,Researcher education,Conceptual change,Interdisciplinary,Knowledge creation

Martina Ann Kelly, University of Calgary, Canada; Lara Nixon, University of Calgary, Canada; Tim Dornan, Queen's University Belfast, United Kingdom;

The aim of this workshop is to introduce qualitative evidence synthesis (QES), which is a suite of newer and less well-known methodologies than traditional systematic review. Qualitative evidence synthesis (QES) is ëany methodology whereby study findings are systematically interpreted through a series of expert judgments to represent the meaning of the collected work. In (QES), the findings of qualitative studies ñ and sometimes mixed-methods and quantitative research ñ are pooled.í A range of QES methodologies exist, which can be challenging to negotiate given diverse terminology and epistemological underpinnings. Examples include meta-ethnography, thematic synthesis, meta-study and qualitative interpretative synthesis. Methodologies share, however, a number of underlying principles with regards to searching, sampling, quality appraisal and synthesis. We will illustrate these by drawing on our experience

conducting a meta-ethnography, one of the most common approaches used in QES. Like QES itself, this workshop will be participatory and constructionist. Participants will be invited to share their experiences. Time will be allocated to facilitate discussion and to allow participants to draw out commonalities and tensions within the QES process, in relation to other quantitative and qualitative review methods . By the end of the workshop participants will be equipped with sufficient resources to enable appraisal of key issues in relation to conducting QES. QES methods are suited to education research because they allow researchers to synthesize evidence from diverse study types and research questions, address issues of context and contribute substantively to theory development

L 7

28 August 2015 15:45 - 17:15

Room Green_A2

Thematic Poster

Attitudes and beliefs

Attitudes and beliefs

Keywords: Quantitative methods,Student learning,Attitudes and beliefs,Motivation and emotion,In-service teacher education,Special education,Self-efficacy,Primary education,Case studies,Mixed-method research,School effectiveness,Social sciences,Self-regulation,Higher education,Cultural diversity in school,Citizenship education,Multicultural education,Teacher professional development,Reading comprehension

Sig's: SIG 1 - Assessment and Evaluation,SIG 11 - Teaching and Teacher Education,SIG 13 - Moral and Democratic Education,SIG 15 - Special Educational Needs,SIG 16 - Metacognition,SIG 8 - Motivation and Emotion

Chairperson: Anke Lindmeier, Leibniz Institute of Science and Mathematics Education (IPN), Germany

Epistemic beliefs in children - Results of an empirical study using Concept Cartoons

Quantitative methods,Student learning,Attitudes and beliefs,Motivation and emotion

Andrea Bernholt, Leibniz Institute for Science and Mathematics Education (IPN), Germany;

Research about epistemic beliefs is a steadily growing area in educational psychology and in the field of education. A large amount of published studies are based on questionnaire measures or interview data. Besides this, subjects in most of the published studies are adults or teenagers, only a few studies deal with young children. In our study we questioned if it is possible to assess epistemic beliefs with an instrument including concept cartoons. Moreover, we asked which

epistemic beliefs do young children have and how do they vary between different school levels. For answering these questions we investigated the epistemic beliefs of 1273 3rd and 6th graders of German primary and secondary schools. Results of the data show that students were able to understand and get along with the new instrument with the concept cartoons. Factor analyses and reliabilities suggest that the instrument is a valid and reliable way to assess epistemic beliefs in young children. Results of the comparison between different school levels indicate that epistemic beliefs may not develop in a linear and stringent way as some theories and models assume. Our data rather provides the assumption that epistemic beliefs in children develop recursive and spiral like over time. It also seems that a critical step in the development of epistemic beliefs may be the shift from elementary to secondary school. Further results will be discussed at the conference.

Everything stays different: The development of primary teachersí inclusive attitudes & self-efficacy

Quantitative methods,In-service teacher education,Special education,Attitudes and beliefs,Self-efficacy,Primary education

Thorsten Henke, University of Potsdam, Germany; Christian Jaentsch, University of Potsdam, Germany; Jennifer Lambrecht, University of Potsdam, Germany; Nadine Sporer, University of Potsdam, Germany; Stefanie Bosse, Universitat Potsdam, Germany;

The professional competence of teachers is an important basis for the implementation of inclusive education. Both the attitudes and self-efficacy of teachers towards inclusive education are relevant aspects of professional competence. The following study focuses on a longitudinal analysis of inclusive attitudes and self-efficacy of N = 250 German primary school teachers who completed an online-questionnaire at three measurement points. The aim of the study is to scrutinize the variability or stability of the constructs over time. Additionally, it will be checked if earlier self-efficacy is a predictor of later inclusive attitudes. The data is analyzed by means of longitudinal structural equation models. The first results on two measurement points indicated that both constructs are stable over time.

Transition to secondary education: The role of the primary teacher in study orientation

Case studies,Mixed-method research,School effectiveness,Attitudes and beliefs,Social sciences,Primary education

Elien Sneyers, University of Antwerp, Belgium;

In the past, significant strides have been made in studying educational inequality. This study opts to add to the knowledge on the mechanisms conducive to differences in educational orientation by integrating research on teacher-student relationships in educational effectiveness research. The role of the primary teacher in the study orientation of pupils who are about to make the transition to secondary education, is being examined. This research aims to define (1) which teacher expectations and beliefs (self-other perceptions) are decisive for pupilsí study orientation, both at individual teacher and collective school level, (2) the processes whereby teacher self-

other perceptions exert an influence on study orientation (teacher practices and teacher-pupil relationship), and (3) which pupil, teacher and/or school characteristics are essential for the association between teacher self-other perceptions and study orientation. Using a mixed-methods research design, (mainly) qualitative and quantitative data from both teachers and pupils are being gathered through the use of focus groups, in-depth interviews, observations and questionnaires.

Does time orientation matter in the decision to enroll and in adaptation to college?

Attitudes and beliefs,Self-regulation,Higher education,Motivation and emotion

Carole Vezeau, College Regional of Lanaudiere at Joliette, Canada; Therese Bouffard, Universite du Quebec a Montreal, Canada; Mathieu Roy, University of Quebec in Montreal, Canada;

Studies in the school domain showed that time orientation is linked to a diversity of outcomes such as studentsí school achievement, engagement and value of schooling and learning and procrastination. So far, studies on whether time orientation affects a student decision to enroll in higher education are scarce. Also since most of the studies are transversal, the nature of the relation between time orientation and the outcomes is unclear. In the first study, 2206 high school students reported on their time orientation and whether they had applied to college for the coming year. In the second study, the time orientation of 371 at their last year of high and several indicators of their school functioning at the end of their first semester at college were examined. Results of Study-1show that students who applied to college were less past and present oriented and more future oriented than those who did not applied. Results of Study-2 reveal that The studentsí orientation towards the past at high school was negatively related to adequate school functioning. Conversely, studentsí orientation towards the future at high school, was positively related to a more optimal learning pattern such as higher use of self-regulation strategies, perception of school competence, engagement and end-semester grades. Teachers and parents might be informed about how to help students to increase their focus on the future.

Pilot study of Hungarian 4th and 6th gradersí national identity and intergroup attitudes

Quantitative methods,Cultural diversity in school,Attitudes and beliefs,Citizenship education,Primary education,Multicultural education

Katinka Dancs, University of Szeged , Hungary;

The development of national identity and tolerance are considered to be strongly related to school. However, educational sciences rarely focus on these topics. Childrenís intergroup attitudes are studied together with social identities (e. g. national identity), because according to the social identity theory a personís need for positive self-evaluation is achieved through the positive distinctiveness of the in-group and also leads to negative attitudes towards out-groups. However, the results of studies investigating childrenís attitudes are heterogeneous. The aim of our study was (1) testing the reliability and validity of the assessment tools which we had adapted from the literature and (2) investigating the connection between the strength of

identification and group preferences. The study was performed in October 2014 with the participation of 180 students from 4th and 6th grade. Childrenís preference towards Hungarians, Americans, Romani people (they are also called Gypsies), Romanians and Polish were assessed. The Hungarian versions of the adapted assessment tools were satisfying, they both proved reliable. A significant difference was found in childrenís strength of identification; 4th graders exhibited significantly higher level of national identification than 6th graders. The results of the trait attribution task indicated strong in-group preference in 4th grade but the in-group preference did not appear in 6th grade. Significant correlation was found between childrenís identification and the positive and negative traits attributed to Hungarians and Romanians. The outcomes strengthen the assumption of childrenís in-group preference in the case of 4th graders. Further studies are needed to investigate other factors (e.g. social context and thinking skills) which can affect childrenís attitudes.

Effects of teachersí pedagogical content beliefs on students' competence gains in reading skills

Quantitative methods,Teacher professional development,Attitudes and beliefs,Reading comprehension,Primary education

Frank Egloff, University of Munster, Germany; Natalie Foerster, University of Munster, Germany; Elmar Souvignier, University of Muenster, Germany;

The aim of our study was to investigate whether teachersí pedagogical content beliefs (constructivist and direct-transmissive beliefs) directly affect studentsí gain in reading fluency and reading comprehension. Moreover, we analyzed whether the level of studentsí initial reading fluency and reading comprehension ability moderates the effect of teachersí pedagogical content beliefs on studentsí reading fluency and reading comprehension growth within one school year. To assess growth in reading, 468 students of 29 regular German fourth grade classrooms completed eight parallel-forms of short internet-based reading tests which were administered repeatedly at intervals of three school weeks for a period of eight months. Teachersí pedagogical content beliefs were assessed using a constructivistic orientation scale (COS) and a direct-transmissive orientation scale (DOS) concerning reading instruction and a scale about general constructivist orientation on teaching (GOS). Results reveal no main effects of the teachersí pedagogical content beliefs on the studentsí learning gains, neither for reading comprehension nor for reading fluency. However, in line with prior research main effects of all three belief-scales point to the expected directions for reading fluency (p.10). Moderating effects of studentsí initial level of reading ability were found for reading comprehension and teachersí constructivist orientation (p.05): the higher studentsí level of reading comprehension skill, the more positive the relation between teachersí constructivistic pedagogical content beliefs and studentsí learning gain. In sum, results reveal that teachersí beliefs have a small direct impact on learning gains, but moderating effects of studentsí initial level of achievement have to be taken into consideration.

L 8

28 August 2015 15:45 - 17:15

Room Green_A3

Thematic Poster

Cognitive skills

Cognitive skills

Keywords: Quantitative methods,Student learning,Cognitive development,Cognitive skills,Comprehension of text and graphics,Primary education,Experimental studies,Higher education,Literacy,Early childhood education,Numeracy,Reasoning,Biology ,Neuroscience,Emotion and cognition,Game-based learning

Sig's: SIG 12 - Writing,SIG 17 - Qualitative and Quantitative Approaches to Learning and Instruction,SIG 2 - Comprehension of Text and Graphics,SIG 22 - Neuroscience and Education,SIG 5 - Learning and Development in Early Childhood

Chairperson: Maryse Bianco, Universite Pierre-Mendes-France, France

Spatial Ability: Developing elementary school studentsí spatial abilities through training

Quantitative methods,Student learning,Cognitive development,Cognitive skills,Comprehension of text and graphics,Primary education

Billie Eilam, University of Haifa, Faculty of Education, Israel; Uri Alon, University of Haifa, Israel;

Spatial abilities are an essential cognitive competency, central to interpreting and communicating visual information, and can be improved by training. Researchers recommend the explicit and intentional instruction of these abilities already at an early age. However, school-related practices are rare, as is research and knowledge about this age group and effective modes of itsí training. The study aimed to investigate effects of training on elementary-school children's spatial abilities as related to age and sex. Participants were186 first (n=87) and fourth (n=99) grade Israeli students randomly assigned to experimental and control groups. The 8-week training (one hour per week) targeted mental rotation, perspective-taking, and 3D object identification from contour. Data included measures of studentsí general spatial abilities as well as their pre and post training targeted abilities. In addition, a sample of students (n=15) were closely observed for the strategies they employ while responding to spatial-based tasks and were interviewed. Training yielded significantly higher pre-post improvement in the experimental rather than in the control group. No sex effects emerged, and extent of improvement in both grades was similar. Posttests demonstrated near-transfer but not far-transfer. Videotaped sessions and in-depth interviews revealed the employment of three different strategies (global-holistic, spatial analytic and pure analytic) for solving spatial problems. Educational implications are discussed.

Epistemic Beliefs Effect on Eye Movement Patterns in Reading

Experimental studies,Quantitative methods,Student learning,Cognitive skills,Comprehension of text and graphics,Higher education

Benjamin Forsyth, University of Northern Iowa, United States;

This study follows up on previous research (2014, In Press) that demonstrated a selective recall effect via two purported epistemic belief systems called mechanism and organicism. More generally, these studies demonstrated a link between epistemic cognition and basic cognitive processing, but they provided little empirical evidence regarding how it occurs. Therefore, this study investigated how studentsí attention is influenced by preference for mechanism or organicism using an eye tracking methodology. After determining their epistemic belief preference 102 University students were asked to read a text about golf using a Tobii T60 eye tracker. Data revealed a significant interaction between how long a participant reads portions of the text and their preference for mechanism or organicism. The current results strengthen the hypothesis that improved recall when reading text that aligns with oneís epistemic beliefs is facilitated by an increase in how long the text is attended to. Future research will need to look more closely at how these current results extend to other learning contexts.

How Rapid Automatized Naming contributes to reading and writing? An intervention study

Experimental studies,Cognitive skills,Literacy,Early childhood education,Primary education

Caroline Vander Stappen, Universite Catholique de Louvain (UCL), Belgium; Marie Van Reybroeck, Universite catholique de Louvain (UCL), Belgium; Pol Ghesquiere, KU Leuven, Belgium;

Rapid Automatized Naming (RAN) has been shown as a reliable predictor of variability in learning to read. However, discrepancies still exist regarding whether RAN is independent of one other well-established predictor of reading, Phonological Awareness (PA). Up to now, authors have mainly assessed the relationship between RAN, PA and reading with correlational studies or factorial analyses. With an interventional design, this study aims to evaluate the causal link between RAN and PA as well as the respective predictive power of these abilities on reading and writing. Over a period of two months, three groups of 20 second graders will receive respectively a RAN treatment, a PA treatment and a control treatment. According to the common hypothesis, we expect children from RAN treatment to outperform children from PA treatment on both RAN and PA measures. According to the separated hypothesis, we expect children from RAN treatment to improve more than children from PA treatment in RAN and to show no improvement in PA. Highlighting distinct contributions of RAN and PA on reading and writing skills could have strong theoretical implications. This might also have practical implications for prevention in kindergarten and for the treatment of reading disabilities.

Influences of cross-institutional educational settings on childrenís cognitive and academic skills

Quantitative methods,Cognitive skills,Literacy,Numeracy,Early childhood education,Primary education

Petra A. Arndt, Ulm University, Germany; Sina B. Breier, Ulm University, Germany;

Heterogeneity of childrenís literacy and numeracy skills at school entry are a challenge for elementary schools and may constitute a risk for disadvantaged children. Different programs especially in early education (i.e. in kindergarten and preschool) aim to improve school readiness of these children. A special approach is adopted in the German pilot project ìBildungshaus 3 ñ 10î (ëEducation House 3 to 10í). Here elementary schools and kindergartens implemented a close cooperation. Regular educational settings for elementary and preschool children are provided by teachers from both institutions. Cross-institutional, age-mixed groups meet on a regular basis at least once a week. Funded by the BMBF and the ESF of the EU effects of the project on childrenís outcomes are evaluated. Results suggest that for language skills and precursors of reading it is crucial how many years the children participated in cross-institutional, aged-mixed educational settings. In contrast numeracy skills strongly depend on the hours spent in these settings during the last year before school enrollment. For numeracy no effects of years of participation were found. Moreover almost no effects were found for those children who experienced cross-institutional educational settings as elementary school students but not during their time in kindergarten.

Observation competence and theory of mind in preschool children

Quantitative methods,Cognitive development,Reasoning,Biology ,Early childhood education

Janina Klemm, Ludwig-Maximilians-Universitat (LMU), Germany; Beate Sodian, Ludwig-Maximilians-Universitat (LMU), Germany; Lucia Kohlhauf, LMU Munchen, Germany; Birgit J. Neuhaus, LMU Munich, Germany;

Observation is one of the basic methods in science. It is not only an epistemological method itself, but is also an important competence for other methods like experimenting or comparing. However, there is little knowledge about when and how this competence develops. In our study we would like to find out about the factors that are connected to the development of scientific observation and whether it can be trained. One focus lies on childrenís theory of mind, as this has already shown to have an influence on other forms of scientific reasoning in that age group. We investigated observation competency and several potential influencing factors in a sample of German preschoolers. First results show that there is a connection between the childrenís observation competency and their theory of mind, while we could not find an influence of language abilities. This shows that there seems to be a special connection between theory of mind and the reasoning process in observation. This again leads to possible connections between reasoning in observation and general scientific reasoning. Further research shall elucidate this relation more clearly.

Using Optical Brain Imaging to Investigate Functional Changes During Game-Based Learning

Experimental studies,Neuroscience,Cognitive skills,Emotion and cognition,Numeracy,Game-based learning

Nur Cakir, Hacettepe University, Turkey; Murat Perit Cakir, Middle East Technical University, Turkey; Frank Lee, Drexel University, United States;

The gamification of learning has recently emerged as a promising approach toward increasing motivation and engagement of students in the classroom and beyond. MathDash, an award-winning game developed at Drexel University, exemplifies this approach in elementary math education by utilizing multi-step combination methods to solve arithmetic equations in a fun and interactive way. This study aims to investigate several key aspects of the gamification of learning and to tie together increased cognitive load with subsequently greater changes in frontal lobe activation. These observations will be investigated for correlations with improved performance at solving arithmetic problems. Participants will be assessed at the end of a training period for improvements in mathematical reasoning and will be monitored with fNIRS throughout both training and assessment periods. Ideally our study will illustrate that the higher attentional and motivational aspects of games support improved learning and behavioral outcomes. We also hope our study will illustrate that a combination mathematical method improves learning outcomes compared to conventional math education due to increased frontal lobe activation, faster reductions in activation, and improved learning outcomes.

L 9

28 August 2015 15:45 - 17:15

Room Green_A5

Thematic Poster

Early childhood education

Early childhood education

Keywords: Video analysis,Teaching/instruction,Social interaction,Social sciences,Early childhood education,Learning in context,Mixed-method research,Social aspects of learning,Experimental studies,Assessment methods and tools,Cognitive development,Developmental processes,Quantitative methods,Numeracy,Parental involvement in learning,Mathematics,Informal learning,Neuroscience,Lifelong learning,In-service teacher education,Reflection

Sig's: SIG 5 - Learning and Development in Early Childhood

Chairperson: Joana Cadima, University of Porto, Portugal

Scaffolding in Early Mother-Child-Interaction

Video analysis,Teaching/instruction,Social interaction,Social sciences,Early childhood education,Learning in context

Anja Sommer , University of Bamberg, Germany;

Scaffolding, defined as support given by an adult during a childís learning process, is an interaction behavior, which is found to be beneficial for childrenís development. Although different study results point to single maternal, child, and context characteristics being related to scaffolding behavior with children, comparatively little is known about the exact interplay of different characteristics within an infant population. Therefore, our research expands the questions of (1) how scaffolding behavior is performed, and (2) explores its associations to and the interplay of maternal, child, and context characteristics. Using data of the German National Educational Panel Study our analyses are based on samples of 7 month old children. Maternal interaction behavior is assessed by coding a scaffolding-eliciting play situation. Results of the pilot study (n=169) indicate that scaffolding behavior is displayed in about a quarter of the play time. Moreover, hierarchical OLS-regression analyses reveal that maternal characteristics are not strongly related to scaffolding behavior. However, considering child characteristics we find scaffolding behavior being significantly decreased in interactions with boys. This relation also remains unaffected by including context variables. We will further these analyses with data of the main study (n=3500), which will be released in December 2014.

Exploring classroom quality through teacherñChild interactions and teachersí pedagogical practices

Mixed-method research,Teaching/instruction,Social aspects of learning,Social sciences,Early childhood education,Learning in context

Jenni Salminen, University of Jyvaskyla, Finland;

This study sought a more profound knowledge of the role that teachers play in childrenís learning and development in Finnish preschool classrooms by exploring teacherñchild interaction and classroom quality. This goal was pursued in the three empirical studies that comprise this study. The data for all sub-studies were gathered as part of the longitudinal First Steps study, and pertained to its sample of 49 Finnish preschool teachers. Data were gathered through structured classroom observations, utilising the Classroom Assessment Scoring System (CLASS: Pianta, La Paro, & Hamre, 2004, 2008) and by audio and video recording teacherñchild interactions in the classrooms. The data included a variation of both quantitative (sub-study I) and qualitative (sub-studies II and III) information and it were analysed and reported along the principles of sequential mixed methods research design. The majority of the teachers in this sample represented generally high levels of observed quality. The results of this study indicate that teachersí emotionally sensitive and responsive practices (Emotional Support) combined with constructive classroom management (Classroom Organisation) further created advantageous opportunities for instructionally supportive practices to take place. The results also reflect the teachersí pedagogical sensitivity in their interactions with the children. Pedagogical sensitivity was observed in teachersí noticing and timely reacting to childrenís individual social and pre-academic needs and was concretised in a variety of teachersí thoughtful practices. The results

can be seen to benefit both teacher educators and professionals working in the preschool classroom, especially from the perspective of transitioning to primary school.

Applying a concept mapping developmental programme in pre-school kindergarten

Experimental studies,Assessment methods and tools,Cognitive development,Developmental processes,Learning in context

Anita Habok, University of Szeged, Hungary;

The theoretical background of the present research comes from the theory of meaningful learning and concept mapping, and from the project method. The main objective of the developmental programme was to employ concept maps embedded in kindergarten projects. The use of concept maps focuses on calling childrenís attention to relationships and drawing conclusions. The current study is a replication of a project completed in 2011. Our sample was formed of 5-7 year ñold pre-school kindergarten children (Nexp.=24, Ncontr=43). As pre- and post-programme tests, the Comprehension of Relations and Experiential Reasoning tests were used from the DIFER measurement tool system (Diagnostic System for Evaluating Development), which is a popular diagnostic tool for 4-8 year-old children in Hungary. The two tests were chosen to cover the areas we aimed to develop with the concept maps. At this stage of the research the pre-test data has been collected and the first experimental session has been implemented on the topic of mushrooms. Our pre-programme tests2014 showed significant differences between the experimental and control group: the control group achieved higher scores. Our program will end in April and we expect the pattern to be reversed, i.e., post-programme performance should be significantly better in the experimental group.

The value of numerical mother-child interaction on the numerical skills of very young children

Quantitative methods,Numeracy,Parental involvement in learning,Mathematics,Informal learning

Annelies Ceulemans, Ghent University, Belgium; Karel Hoppenbrouwers, Catholic University of Leuven, Belgium; Sofie Rousseau, Catholic University of Leuven, Belgium; Annemie Desoete, Ghent University, Belgium;

This study explored the relationship between numerical mother-child interactions and numerical competencies in 31 children who were followed up from toddlerhood (24 months of age) till kindergarten (48 months of age). All children were tested on their ability to discriminate small numbers in toddlerhood and on their numerical competencies in kindergarten. Through a structured play situation the frequency of numerical mother-child interactions at both time points in the current study was observed. The study confirmed the positive linear relationship between concurrent numerical mother-child interaction and numerical competencies in kindergarten above maternal sensitivity. Such relationship with small number discrimination could not be confirmed in toddlerhood. However, the results showed a predictive contribution of toddlersí numerical mother-child interaction to later numerical competencies in kindergarten. The results,

furthermore, underline the differential relationship of numerical mother-child interaction with arithmetic operations as the relationship is linear in kindergarten but quadratic in toddlerhood. Implications are discussed in terms of fostering numeracy. At last, limitations and suggestions for future research are outlined.

Early longitudinal development of executive functioning in two to three year olds

Experimental studies,Neuroscience,Cognitive development,Social sciences,Early childhood education,Lifelong learning

Ilona Veer, University of Twente, Netherlands; Cathy van Tuijl, Utrecht University, Netherlands; Hans Luyten, University of Twente, Netherlands; Peter Sleegers, Twente University, Netherlands;

Although previous studies have shown that executive functions can affect student learning, longitudinal studies into how executive functions develop in toddlerhood are still scarce. To get more insights into the developmental nature of executive functions , more research is needed into the relationships between different executive function components and how these components and their relationships develop in early childhood. The present study examines the relationships between three basic components of toddlersí executive functioning (selective attention, working memory and delay of gratification) and how these relationships develop over time. Additionally, differences between children based on ethnic and socio-economic background are discussed. A structural equation model is tested in which the relationships between EF components are hypothesized, using a sample of 284 toddlers of 30 preschools, tested at two waves (at 33 and 39 months of age). Our study shows that selective attention uniquely predicts working memory over time and not delay of gratification.

Measuring improvement using ECERS: A training intervention in pre-schools in one local authority

Mixed-method research,In-service teacher education,Reflection,Early childhood education,Learning in context

Denise Kingston, Institute of Education, United Kingdom; Iram Siraj, University College London, Institute of Education , United Kingdom;

This study was conducted over a period of three years within the context of a local education authority (LEA) in England. A quasi-experimental repeated measures mixed methods design was chosen to consider: first, the quality of all (approximately three hundred) pre-school settings within the county; and second, the impact of a short training intervention on a sample of fifty private, voluntary and independent (PVI) settings with matched controls. A baseline measure of quality was established through observations using Early Childhood Environment Rating Scales (ECERS) (Harms et al, 1998 and Sylva et al, 2003) together with structured interviews which focused on context and structure. The targeted training intervention significantly improved total quality scores on ECERS (Wilcoxon $z = -4.452$, $p=.000$). Interviews and focus groups suggested that change was attributable to aspects of leadership, the culture within the setting including

staffís understanding of their role and responsibilities, the qualifications and experiences of staff and the status and respect they, their families and the community attributed to a career in early childhood. Although improvement was noted, excellence in quality was not evident

L 10

28 August 2015 15:45 - 17:15

Room Green_A6

Thematic Poster

Emotion and affect

Emotion and affect

Keywords: Attitudes and beliefs,Emotion and affect,Vocational education,Motivation and emotion,Content analysis,Cultural diversity in school,Achievement,Quantitative methods,School effectiveness,Teacher professional development,Developmental processes,Language (L1/Standard Language),Early childhood education,Teaching/instruction,Secondary education,Communities of learners,Qualitative methods,Organization of educational research(sounds strange),Workplace learning,Problem-based learning,Emotion and cognition,Writing/Literacy,Primary education

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 14 - Learning and Professional Development,SIG 21 - Learning and Teaching in Culturally Diverse Settings,SIG 5 - Learning and Development in Early Childhood,SIG 8 - Motivation and Emotion

Chairperson: Susan Beltman, Curtin University, Australia

Aprentices` (Dis)Satisfaction: A Review Study

Attitudes and beliefs,Emotion and affect,Vocational education,Motivation and emotion

Cindy Grzanna, TU Dresden, Germany;

Apprenticesí (Dis)Satisfaction in VET in Germany is clearly connected with occupational success (Zielke, 1998) and/or drop outs, cancellation of apprenticeship contracts (Klinck, 2012; DGB, 2013). In times of rising youth unemployment (Cahuc et al., 2013) and lacking skilled personnel it is alarming that rate of contract break offs in VET is still increasing in Germany (BMBF, 2013). Rising break offs effect German companies in VET facing arising net costs of approx. 580 Million Euro per year (Wenzelmann & Lemmermann, 2012). It is known that situational and personal factors determine (dis)satisfaction (Fischer & Fischer, 2005; Abele et al., 2006). Therefore different factors are important for apprenticesí (dis)satisfaction and completion apprenticeship training. To prevent negative effects of apprenticesí dissatisfaction it is necessary to find out whether situational or personal aspects are the most important factors for apprenticesí

risk situations. The background to this is that personal factors can essentially not be influenced whereas situational factors can be mainly influenced to prevent drop outs resp. cancellation of apprenticeship contracts. To solve existing problems in research and practice a literature review is needed to evaluate existing personal and situational factors resp. reasons for (dis)satisfaction. Research in this field can contribute to take realistic measures to prevent factors that are responsible for dissatisfaction and thereby increase risk of drop outs and cancellation of contracts in VET. Furthermore research in apprenticesí satisfaction can help to improve the attraction of the German system of VET.

Acculturation and academic achievement of minority youth

Content analysis,Cultural diversity in school,Achievement,Attitudes and beliefs

Elena Makarova, Universitat Wien, Austria; Dina Birman, University of Miami, United States;

An achievement gap between immigrant and non-immigrant students has been identified in most OECD countries and the high school dropout rate among immigrant students has become a serious challenge for national educational systems. The school failure of immigrant youth is embedded in the process of their acculturation in the host country. The adjustment outcomes of the acculturation process vary in relation to the acculturation orientations favoured by immigrant and minority youths. The school context has been recognized to be the crucial context for minority youthsí acculturation in the host country. The academic achievement of minority youth is thus embedded in the acculturation process, which involves cultural identity development, psychological adjustment and behavioural adjustment. The study is aimed at analysing and systematizing the findings of empirical research on youthsí acculturation in the school context which focusses on minority youthsí academic achievement. For purposes of this study 29 peer reviewed articles from a total of 348 articles that matched the search criteria were selected according to inclusion criteria postulated for this study. The selected articles addressed minority youthsí academic achievement in relation to at least one of the issues of youthsí acculturation such as cultural identity, psychological adjustment, and behavioural adjustment. The articles were analysed by applying the method of qualitative content analysis. Overall, the results of our analysis provide multifaceted insights into issues of minority youthsí acculturation in relation to their academic achievement. Moreover, our findings reveal the complexity of relations between youthsí cultural transition and their school adjustment.

Influence of teachersí expectations on kindergarten children`s linguistic competencies

Quantitative methods,School effectiveness,Teacher professional development,Developmental processes,Language (L1/Standard Language),Early childhood education

Catharina Tibken, University of Wuerzburg, Germany; Andrea Beinicke, University of Wuerzburg, Germany; Regina Goetz, University of Wuerzburg, Germany; Kristine Blatter, University of Bamberg, Germany; Sebastian Kempert, Humboldt-Universitat zu Berlin , Germany; Wolfgang Schneider, University of Wurzburg, Germany;

Since Rosenthalís and Jacobsenís discovery of the Pygmalion Effect (1966), the role of teachersí expectations for their studentsí later academic achievement has been investigated in a large number of studies. Additionally, some recent studies provide evidence that it is quite challenging for teachers to diagnose their studentsí competencies accurately. Combining both issues, inaccurate diagnostic judgments may influence studentsí further academic development positively as well as negatively. However, up to now the question remains whether teachersí expectations already affect the achievement of young children in kindergarten. In our study we address this question with regard to childrenís linguistic development. We examined 306 German children during the last two years of kindergarten (age 4-6 years). We repeatedly administered a variety of tests of linguistic and phonological competencies at four measurement points. Additionally, kindergarten teachers were asked to rate the childrenís grammatical abilities, vocabulary knowledge, and phonological awareness, separately for each kindergarten year. When comparing the teachersí ratings of the childrenís competencies with the competencies measured with the tests, we found moderate correlations for all domains. Results of regression analyses for the first two measurement points revealed the following pattern: The greater the overestimation of the teacher ratings, the greater the gain in the childrenís linguistic development. Conversely, those children underestimated by their teachers showed lower gains in their competencies. We predict similar effects for the last year of kindergarten. It thus appears that kindergarten teachersí expectations influence childrenís language acquisition in subtle ways and thus should be reflected more consciously.

Physical and mental injuries of students caused by their teachers

Quantitative methods,Teaching/instruction,Emotion and affect,Secondary education,Communities of learners

Dunja Stachelhaus, Bergische Universitat Wuppertal, Germany; Martina Braasch, University of Wuppertal, Germany; Petra Buchwald, Bergische Universitat Wuppertal, Germany;

Although numerous students experience physical and mental injuries by their teachers in everyday student life (Krumm & Weiss, 2005), research about the types of the most sustainable wounds and the reasons for their sustainablity is sparse. Based on appraisal theories (Honneth, 1992; Helsper et al., 2005; Kammler, 2013) wounds can be assumed as unfulfilled needs of appraisal, representing an attack on the personís self. This may cause destabilization of the self, often compensated by self-defense in terms of rejectional behavior (Helsper, 1995). In order investigate the types of teacher behavior which cause the most sustainable wounds in students and the effects resulting from specific types of wounds, 83 students have been surveyed within a retrospective questionnaire-based study. The items of wounding behavior of teachers are based on Krumm and Weiss (2005). By means of factor analysis, four categories of injuries were generated (injustice/ignoring; defamation/humiliation; verbal attack; physical attack). Moreover, two factors of wound effects could be extracted, which, on a theory-driven manner, were labelled self-destabilization and self-defense. The sustainability of wounds was measured based on their frequency of impairment, whereas defamation was mentioned as the most sustainable wound by over 60 % of the students and thereby caused destabilization of the self. Yet, wounds such as injustices, which more often lead to self-defense, turned out to be less sustainable. By approaching towards a reflective society, it is important to gain further more current insights to

which extent this unfortunately possibly still existing misbehavior can be traced back in todayís students.

Individual and collective reflection on the development of schools and learning during integration

Qualitative methods,Organization of educational research(sounds strange),Teacher professional development,Developmental processes,Workplace learning,Problem-based learning

Maria Safronova, Moscow State University of Psychology and Education, Russia (Other);

The paper discusses how perspectives for educational practice of parents, learners, teachers, and headmasters of schools and kindergarten came to a new solution together through overcoming internal contradictions in the individual activity systems of the institutions. Problem task is given by local policy aimed to provide equal educational opportunities for the children and improve the quality of education in the context of integration. Based on the L.S.Vygotskyís cultural-historical theory and idea of mediated act (1978), A.N.Leontievís activity theory (1978), Y.Engestromís model of two interacting activity systems and formative intervention method ìChange Laboratoryî (Engestrom, 2001) is used as a key experimental technique. Study investigates ascending from the abstract idea to a new concrete collective concept of the activity of an integrated institution as a stepwise resolution of the contradiction between the individual and the common in education in Moscow, Russia. The first session focuses on problematization and objectification of the needs and motives of practitioners. During the second session historical genesis and actual models of separated activity systems are reconstructed. At the third session, parentsí and studentsí needs are presented, and the key pedagogical idea grows. Administrators and teachers in the discussions and group work faced with the internal and external crisis for the educational institutions and new social situation of the development. They focus educational practices development on the finding a new future-oriented product and its conceptualization. Through reflections the idea of individualized instruction is emerged and discussed between participants as a new collective concept.

Reflecting on emotions at school. A research on childrenís affective self-understanding

Qualitative methods,Emotion and cognition,Writing/Literacy,Primary education

Federica Valbusa, University of Verona, Italy;

The subject of this research is emotional education, that consists in encouraging children to reflect on their emotions. Nowadays, doing research on this theme is particularly important because of the fact that the society in which children live and grow is increasingly characterized by the phenomenon of ìemotional illiteracyî (Goleman 2006). Some scholars (Nussbaum 2001; Oatley 1992) state that emotions have cognitive components. This leads to reveal how emotions can be the object of a process of understanding (Mortari 2009a), focused to their clarification, expression and management. Following this perspective, childrenís emotional literacy can be improved by facilitating the development of the reflective postures that characterize the practice of ìaffective self-understandingî (Ibidem). The research arises from two questions: 1) How does

one organise an educative experience that can improve childrenís emotional literacy? 2) What ways of affective self-understanding emerge from an educative experience that is structured on the basis of a cognitive conception of emotions? The study is designed to organise an educative experience aimed to increase affective self-understanding in children of the fourth classes of a primary school situated in the province of Verona in Italy. The research has a qualitative framework and it aims to meet two goals. First, it will highlight if and how the activities provided by the educative project appear able to improve childrenís emotional literacy. Second, it will shed light on the cognitive acts that have guided affective self-understanding in the children involved in the research.

L 11

28 August 2015 15:45 - 17:15

Room Brown_B7

Thematic Poster

Higher education

Higher education

Keywords: Design based research,Quantitative methods,Assessment methods and tools,School effectiveness,Achievement,Mixed-method research,Social interaction,Professions and applied sciences,Vocational education,Psychometrics,Competencies,Self-efficacy,Social sciences,Higher education,Learning analytics,Student learning,Action research,Qualitative methods,Reflection,Informal learning

Sig's: SIG 1 - Assessment and Evaluation,SIG 14 - Learning and Professional Development,SIG 4 - Higher Education

Chairperson: Anna-Katharina Praetorius, German Institute for International Educational Research (DIPF), Germany

Promoting science education: The effectiveness of the preparatory program in higher education

Design based research,Quantitative methods,Assessment methods and tools,School effectiveness,Achievement

Irit Sasson, Tel Hai Academic College, Israel;

Higher education is one of the important means of socio-economic mobility in modern societies, and therefore the issue of accessibility to higher education is an important debate in higher education. In order to provide access to science education for young people who want to learn science but do not have the needed science background in early studies or do not meet the

minimum requirements of the faculty of sciences, many academic institutes offer preparatory programs. This research goal was to evaluate the effectiveness of the science preparatory program at Tel-Hai College. 78 graduates of the preparatory program participated in this research in the experimental group. Results were compared to a control group which included 76 students in the same departments who entered the college without the preparatory program. Academic and social adaptation was evaluated using self reporting questionnaires. In addition academic achievements were evaluated. Results indicated a high degree of satisfaction from the program. Findings indicate a significant advantage in the sensation of academic adaptation among the preparatory program graduates compared to other students in the faculty of science. No significant differences were found between the groups in social adaptation. The best significant predictor for academic success was students' grades in the mathematic course during the preparatory program. The study highlights the strengths of the preparatory program that provides students a positive experience in academic learning. However, some gaps are still evident in compare to other students in the science faculty.

A knowledge assessment tool supports identifying patterns of conversations by coaches in training

Mixed-method research,Social interaction,Professions and applied sciences,Vocational education

Pablo Pirnay-Dummer, Martin-Luther-Universitat Halle-Wittenberg, Germany; Susanne Gunther, University of Passau, Germany;

Training of new coaches is a complex task where a tremendous focus lies on proper guided conversation. In our study (N=50) we conducted an automated semantic analysis that is usually used for knowledge management. The elicitaion of such semantic structures is an asset in identifying the conversational competences of the trainees, both for feedback and formative evaluation. Our study shows promising results, particularly for the allocation of individual competencies when compared to a whole group of trainees. This also allows for researchers to track the concepts of the theoretical foundations and their transfer into practice in order to describe how and to which extent they influence decisions for dialogue.

Expertise in advanced musical performance: Physiological and psychological health in HE students

Psychometrics,Quantitative methods,Competencies,Self-efficacy,Social sciences,Higher education

Ioulia Papageorgi, University of Nicosia, Cyprus; Filipa La, University of Aveiro, Portugal;

Expertise in advanced musical performance: Physiological and psychological health in higher education students Learning to play a musical instrument is a complex process, requiring the development of aural, cognitive, technical, musical, communication and performing skills (Hallam, 2006). The excessive technical demands of performance, along with its highly competitive nature, can lead to both psychological and physical stress in musicians (Papageorgi and Kopiez, 2012). The aim of the study was to conduct assessments and comparisons of: (i)

perceived general health and well-being; (ii) prevalence of physical and psychological health music-related problems; (iii) health awareness; and (iv) health risk evaluations. Data were collected through a questionnaire survey instrument drawing on previous existing standardised instruments to measure musculoskeletal symptoms at the workplace (Kuorinka et al., 1987), available literature on epidemiological studies related to musicians (Guptill, 2008), as well as standardised scales measuring trait and state anxiety (Spielberger, 1983), musical performance anxiety (Papageorgi, 2007), self-esteem (Rosenberg, 1989) and musical self-efficacy (Sherer et al., 1982, Welch et al., 2008; Papageorgi et al., 2010). Participants were 200 performing musicians in higher education in Cyprus and Portugal. The study adds to the current body of knowledge on issues surrounding the development of expertise in advanced musical performance and how physiological and psychological issues might affect expertise development in performing musicians. Implications for the education and training of higher education students are discussed.

Studentsí use of the library and learning outcomes: Evidence from a Chilean university

Learning analytics,Student learning,Achievement,Higher education

Carlos Gonzalez-Ugalde, P. Catholic University of Chile, Chile; Maximiliano Montenegro, Pontificia Universidad Catolica de Chile, Chile; Nick Kelly, University of Southern Queensland, Australia; Elvira Saurina, Pontificia Universidad Catolica de Chile, Chile; Magdalena Jara, Pontificia Universidad Catolica de Chile, Chile; Rosa Alarcon, Pontifica Universidad Catolica de Chile, Chile;

We present the outcomes of a study aimed at answering the following questions: 1) is there any difference in library usage patterns across disciplines? And 2) is there any relation between uses of electronic resources, access to library resources and studentsí performance? We employed learning analytics techniques to work with databases that register studentsí interactions with the library resources and materials, and combined them with studentsí academic records. In relation to the first question, we found that there are differences across disciplines. For example, medical students would prefer e-resources while humanities students tend to use more print and audiovisual material. In relation to the second question, we found that there are positive associations between library use and student achievement. Also, our results suggest that use of e-resources makes the difference. These results are important as they provided further evidence on the relationship between library use and student achievement; and also offer key information to university managers to design programs for targeting particular group of students and to justify the value of the library, in a context of competing demands for funding.

Utilizing Reflective Practice in Designing a Co-Curricular Model for Employability Enhancement

Action research,Qualitative methods,Student learning,Reflection,Higher education,Informal learning

Cheryl Foxcroft, Nelson Mandela Metropolitan University, South Africa; Jennifer Winstead, Nelson Mandela Metropolitan University, South Africa; Kim Elliott, Nelson Mandela Metropolitan University , South Africa;

For students to have a transformative educational experience which prepares them for employment, they need multiple intentional learning opportunities to develop holistically through formal academic programs, co-curricular involvement and engagement in campus, local and international community activities (Learning Reconsidered, 2004). Within higher education there is an established process to formally record and recognize learning outcomes in academic programs. However, a similar process for recording and recognizing the learning outcomes of out-of-the-classroom involvement is far less prevalent, though equally important for employability development. International organizations, such as the Council for the Advancement of Standards in Higher Education (CAS), are challenging universities to address this issue through the creation of standards related to holistic student learning to enhance student development aimed at improving post-graduate factors, such as employability. Through the formalization of a process to recognize co-curricular learning opportunities in the form of a co-curricular record project, the researchers used their university for a case study to explore how reflective practice in co-curricular involvements can enhance employability. By increasing student awareness of the need for holistic development, providing formalized out-of-the-classroom learning opportunities, encouraging faculty and staff formalized program development and offering employer assistance, the Co-Curricular Record (CCR) project has been an innovative campus wide solution towards utilising reflective practice to enhance employability of university graduates.

L 12

28 August 2015 15:45 - 17:15

Room Green_A7

Thematic Poster

Learning disabilities and special education

Learning disabilities and special education

Keywords: Qualitative methods,Special education,Learning disabilities,Early childhood education,Learning in context,Conversation/ Discourse analysis,Secondary education,Vocational education,Case studies,Experimental studies,Assessment methods and tools,Mixed-method research,Peer interaction,Science education,Primary education,Integrated learning,Cognitive development,Cognitive skills,Learning and developmental difficulties,Parental involvement in learning

Sig's: SIG 1 - Assessment and Evaluation,SIG 15 - Special Educational Needs

Chairperson: Riikka Mononen, University of Helsinki, Finland

Children's Books as a Mediating Tool about Children with Special Needs

Qualitative methods,Special education,Learning disabilities,Early childhood education,Learning in context

Lea Baratz, Ahva College of Education , Israel;

The current study addresses the disparity between the awareness of teachers in special education frameworks regarding the important role of books as a mediating tool and their reticence to use this tool. Twenty three interviews were conducted in two stages: before and after using the book Shelley the Hyperactive Turtle in the classroom. Interviews attempted to examine teachersí perceptions regarding the use of the book with a student population that has the disorder featured in the book. Even while teachers expressed awareness of the importance of books as a mediating tool, they explained their reasons for refraining from integrating books that are not part of the official curriculum in the course of their work. The findings indicate the need for a novel approach regarding the inclusion in the curriculum of books that feature learning disorders, while simultaneously addressing teachersí emotional needs and expanding their knowledge of the bibliotherapeutic process. In this manner, books, which have a recognized and distinct mediating role, can become a significant and useful tool for teachers. The current study contributes to the professional literature by conveying teachersí perspectives regarding their use of a children's book in the classroom, which could serve as a source for the personal empowerment of both the teachers and the student readers, in a case focusing on ADHD.

Studentsí and professionalsí perceptions of school complementary services

Conversation/ Discourse analysis,Qualitative methods,Special education,Learning disabilities,Secondary education,Vocational education

Sylvie Frechette, Universite du Quebec a Trois-Rivieres, Canada; Nadia Rousseau, Universite du Quebec a Trois-Rivieres, Canada;

The study examines studentsí, teachersí, school administrationsí and other school professionalsí perceptions of the school complementary services offered in the Work-Oriented Training Paths (WOTP) in Quebec (Canada) for students with handicaps or learning disabilities. These programs enable struggling students to get a certification through qualifying training and adapted instruction. To uncover the actual school complementary services provided in the Work-Oriented Training Path and to analyse their effectiveness, semi-structured interviews were conducted with 27 teachers or school complementary staff members as well as with five school principals. Furthermore, 167 students participated in focus groups of six to eight students in order to investigate their experience about complementary services. Participants were recruited in eight Quebec secondary schools located in five school districts that provide the WOTP. The results from the qualitative analyses reveal that there is a variety of complementary services offered to the students and that they are appreciated. However, they are considered insufficient due to the great needs of these particular students. A detailed description to the services offered is provided. The discussion stemming from the results brings forth questions pertaining to the role of complementary services in the Individual Education Plan (IEP) that lists the studentí strengths

and needs, states the relevant educational goals, and identifies the required actions and accommodations for students with handicaps or learning disabilities.

The Observer XT as a tool to assess problem behaviors in adults with intellectual disability

Case studies,Experimental studies,Assessment methods and tools,Learning disabilities

Candida Delgado Casas, University Cadiz, Spain; Rodrigo Gonzalez-Godon, University Cadiz, Spain; Jose I. Navarro-Guzman, University of Cadiz, Spain; Manuel Aguilar-Villagran, University of Cadiz, Spain; M. Carmen Canto, University of Cadiz, Spain;

Aims. The primary aim of this study is to objectively evaluate and analyze behavior problems of a person with profound intellectual (ID) using the software The Observer XT. Method. For this study one adult with profound ID was selected from a special education center for adults (AFANAS-Jerez, Spain). A comprehensive assessment of challenging behaviours of the participant during 15 non-consecutive days was conducted. All sessions were recorded and analyzed with the software The Observer XT, obtaining systematic information concerning the frequency of self-injurious, physical-aggressive and disruptive behaviors. As well, a functional analysis methodology was used, where the participant was observed under nine experimental sessions and nine control sessions to determine the function which maintain the target behaviours. Results. Results show an increase in the frequency of self-injurious behavior after he received some type of positive reinforcement (social attention or self-stimulation). Aggressive behavior allowed him to escape from task demands, rather than serving to provide self-stimulation. And disruptive behavior seemed to be maintained by positive reinforcement (self-stimulation and social attention). Conclusion. The experimental settings establish a procedure that offers a useful, easy and fast implementation. These findings provide further evidence for the utility of functional analysis as a viable method for identifying contingencies that maintain severe problem behavior. It offers substantial evidence about the functional fulfillment of behavior problems oriented towards the program design for personalized intervention.

Fostering inclusive learning in primary science education emphasizing activity and cooperation

Mixed-method research,Special education,Peer interaction,Science education,Primary education,Integrated learning

Eva Blumberg, University of Paderborn, Germany; Frank Hellmich, University of Paderborn, Germany; Theresa Fromme, University of Paderborn, Germany;

This poster presents an empirical research study about fostering inclusive learning in primary science education. It focuses on learning and development conditions and opportunities for an individual optimum development for children with or without special educational needs or disabilities in order to meet their individual opportunities. A multi-way procedure with qualitative and quantitative methods is used. Based on our results we develop didactical material to support its application in schools. Therefore our research addresses the obligatory demand of inclusion and inclusive school education and the demand of empirical based input to realize

inclusive learning with a particular focus on primary school science education. The project, funded by the ìStifterverband fur die Deutsche Wissenschaftî, is based on a cooperation between the department of didactics in elementary science education (Prof. Dr. Eva Blumberg) and the department of primary school pedagogy (Prof. Dr. Frank Hellmich) at the University of Paderborn.

Can parents train visuo-spatial working memory in their children with Down syndrome?

Special education,Cognitive development,Cognitive skills,Learning and developmental difficulties,Parental involvement in learning

Silvia Lanfranchi, University of Padova, Italy; Francesca Pulina, Department of Developmental and Socialization Psychology, Univeristy of Padova, Italy; Barbara Carretti, Department of General Psychology, University of Padova, Italy; Irene C. Mammarella, University of Padova, Italy;

Previous work showed that Visuo-Spatial Working Memory (VSWM) in Down syndrome (DS) is a relative point of strength (e.g. Lanfranchi, Cornoldi and Vianello, 2004). However recent research showed a more complex picture, with adequate performance in the spatial-sequential tasks but not in the spatial-simultaneous ones with respect to typical developing children (Lanfranchi, Carretti, Spano and Cornoldi, 2009; Carretti, Lanfranchi, and Mammarella, 2013). Due to the relevance of spatial-simultaneous component for some everyday abilities, we planned a computer based training program to explore the possibility to improve the performance of individuals with DS. Moreover, the possibility for the training of being administered by parents was explored. The training consisted of activities where memory load and attentional control were manipulated, that were administered twice a week for a month, with sessions lasting approximately 40 minutes. Four groups of children with DS took part to the study: a) an experimental group that received the training by an expert in psychology, b) an experimental group that received the training at home by parents, c) a control group that received a training on phonology and d) an experimental group that did only pre and post test. In the pre and post-test assessment spatial-simultaneous, spatial-sequential, visual and verbal working memory were assessed using tasks involving low and high cognitive load. Moreover transfer effect to visuo-spatial abilities and everyday memory were tested. Results encourage the use of this kind of training procedure for improving spatial-simultaneous working memory in individuals with DS. Moreover parents, adequately supervised, can learn how to work with their children with DS to improve visuo-spatial working memory.

L 13

28 August 2015 15:45 - 17:15

Room Green_A1

Thematic Poster

Mathematics education

Mathematics education

Keywords: Design based research,Student learning,Reasoning,Mathematics,Primary education,Integrated learning,Experimental studies,Neuroscience,Cognitive skills,Numeracy,Case studies,Educational technology,Learning disabilities,Higher education,Model-based reasoning,Learning analytics,Bilingual education,Qualitative methods,School effectiveness,Attitudes and beliefs,Secondary education,Motivation and emotion

Sig's: SIG 11 - Teaching and Teacher Education,SIG 20 - Computer Supported Inquiry Learning,SIG 22 - Neuroscience and Education,SIG 5 - Learning and Development in Early Childhood,SIG 7 - Learning and Instruction with Computers,SIG 8 - Motivation and Emotion

Chairperson: Tine Degrande, KU Leuven, Belgium

A learning trajectory for transformation-based reasoning in geometry

Design based research,Student learning,Reasoning,Mathematics,Primary education,Integrated learning

Nicole Panorkou, Montclair State University, United States; Steven Greenstein, Montclair State University, United States;

This project addresses the need to strengthen geometry instruction in the elementary grades by designing a conceptual framework around transformation-based reasoning upon which elementary geometry education may be constructed. We propose that engaging young students in the transformation-based concept of invariance in the contexts of both Euclidean geometry and topology can provide them with a stronger foundation for understanding the concepts of property, similarity, and congruence in more advanced Euclidean geometry, and also for recognizing the significance of invariance in other domains of mathematics. In this paper, we present our ongoing efforts to develop a learning trajectory for transformation-based reasoning.

Influence of numerical surface form in arithmetic: The effect of mathematical ability

Experimental studies,Neuroscience,Cognitive skills,Numeracy,Mathematics

Josetxu Orrantia, University of Salamanca, Spain; David Munez, University of Salamanca, Spain; Sara San Romualdo, University of Salamanca, Spain; Lieven Verschaffel, KU Leuven, Belgium;

There is considerable evidence that surface form of arithmetic problems influences calculation performance. Relative to Arabic digit format (e.g., 2 + 3), written number word format (e.g., two + three) increases problem difficulty. In addition, the problem-size effect varies with surface form, with a greater effect for problems presented in written word format than in digit format, which suggests that format affects retrieval or calculation processes rather than encoding processes. These effects have been explained by a greater visual familiarity of the digit format relative to written word format. In the present study, we explored an alternative explanation:

Since simple arithmetic involves that operands are converted to an internal magnitude representation, it is possible that Arabic digits gain faster access to magnitude representation than number words. The present study aimed to analyze this issue by effectively eliminating the potential effect of visual representations through a (addition and subtraction) word problem-solving task, which does not encourage activation of such representations. Word problems were presented word by word, at a fixed pace, using rapid serial visual presentation. Results showed that RT was slower for subtraction than addition, slower with large than small operands, and slower for word format than digit format. The word-format cost was greater for larger than small operands, and this effect was greater in the subtraction operation. Lastly, these effects were more pronounced for participants with weaker arithmetic fluency. These results support an explanation based on access to magnitude representation.

Association between numerical magnitude processing and arithmetic achievement

Experimental studies,Student learning,Numeracy,Mathematics

Josetxu Orrantia, University of Salamanca, Spain; Sara San Romualdo, University of Salamanca, Spain; David Munez, University of Salamanca, Spain; Lieven Verschaffel, KU Leuven, Belgium;

A variety of empirical evidence suggests the existence of a relationship between individual differences in numerical magnitude processing and arithmetic achievement. One of the main issues in this body of research is whether childrenís ability to process nonsymbolic magnitudes or their capacity to process symbolic numbers is crucial for successful arithmetic achievement. The current study examined performance of children on two different number processing skills in first grade to determine which skills predict unique variance in second-grade arithmetic performance. The tasks used were a nonsymbolic large-numerosity comparison task, and a symbolic large-numerosity comparison task. Association with arithmetic achievement was observed for the symbolic measure. Regression analysis showed that this association was independent of intellectual ability. This study extends previous results by demonstrating that efficiency to access the magnitude representation from Arabic two-digits is related to individual differences in arithmetic.

Enhancing Studentsí Reasoning about Statistical Inference: The Role of Models and Modeling

Case studies,Educational technology,Learning disabilities,Mathematics,Higher education,Model-based reasoning

Maria Meletiou-Mavrotheris, European University Cyprus, Cyprus; Efi Paparistodemou, Cyp;rus Pedagogical Institute, Cyprus; Ana Serrado Bayes, La Salle-Buen Consejo, Spain;

The transition from descriptive to inferential statistics is a known area of difficulties for students taking introductory statistics courses. This proposed article shares the experiences from a teaching experiment taking place in a college-level introductory statistics classroom, which adopted a non-conventional approach to teaching statistics at the tertiary level that put models

and modelling at the core of the curriculum. Findings from the study indicate that the informal approach to statistical inference adopted in the course, which focused on modeling and simulation using the dynamic statistics software Tinkerplots© as an investigation tool, promoted powerful ways of thinking statistically, while at the same time also developing studentsí appreciation for the practical value of statistics. The affordances offered by the technological tool for building data models and for experimenting with these models to make sense of the situation at hand, were instrumental in supporting student understanding of both informal and formal inferential statistics.

Development of a seminar for studies in mathematics education ñ Encouragement of non-native language

Learning analytics,Bilingual education,Mathematics,Higher education

Eileen Angelique Braun, Mathematik und Informatik, Germany; Kathrin Winter, University of Munster, Germany;

Europe and especially Germany are places of immigration. As a consequence, there are a lot of foreign language children who need to be included into the German school system. A main problem of those children is the German language they often do not know well enough to participate in lessons: ìDespite [Ö] strong learning dispositions, immigrant students often perform at levels significantly lower than their native peers. However, performance levels vary across countries.ì (Stanat/Christensen, 2006) Thus, teachers have to organize their lessons in a different way to give pupils with an immigrant background a better chance of learning. At the Westfalische Wilhelms-University of Munster (Germany), special training courses for aspiring mathematic teachers are designed to prepare them for that situation at school. In this poster, we will show the methodical design of these seminars.

A learning concept about animals living in a zoo for secondary students - changes of beliefs

Qualitative methods,School effectiveness,Attitudes and beliefs,Mathematics,Secondary education,Motivation and emotion

Hannes Stoppel, University of Munster, Germany; Eileen Angelique BraunE, Mathematik und Informatik, Germany;

With this poster we want to present our concept for secondary students. The concept includes ten lessons in two classes of students of grade eight in which the authors teach the students in mathematics. The second part of the lessons based on a realistic context about animals. We would like to examine if they change their opinion abut the value of mathematic for understanding the real world. We expect that the studentís belief of the value of probability theory, statistics and mathematics improves after our learning concept. The engagement of students towards mathematics and application will change. They will realize the relevance of mathe-matics, statistics and probability theory for daily live and nature.

28 August 2015 15:45 - 17:15

Room Brown_B8

Thematic Poster

Motivation

Motivation

Keywords: Quantitative methods,Emotion and affect,Goal orientation,Secondary education,Motivation and emotion,Self-regulation,Primary education,Learning in context,Teaching/instruction,Neuroscience,Synergies between learning, teaching and research,Emotion and cognition,Organization of educational research(sounds strange),Developmental processes,Mathematics

Sig's: SIG 27 - Online Measures of Learning Processes,SIG 8 - Motivation and Emotion

Chairperson: Michael Filsecker, University of Duisburg-Essen, Germany

Are effects of classroom goal structures on student emotions mediated by personal goals?

Quantitative methods,Emotion and affect,Goal orientation,Secondary education,Motivation and emotion

Noemie Baudoin, Universite catholique de Louvain (UCL), Belgium; Benoit Galand, Universite catholique de Louvain (UCL), Belgium;

Student emotions at school play a key role in motivational processes, learning and psychological health (Pekrun, Elliot, & Maier, 2006). This study investigated the effect of classroom goal structures on student emotions and the mediational role of personal achievement goals. Participants were 1661 students (7th and 9th grade) from 132 classrooms. They completed a self-reported questionnaire about their emotions, their achievement goals and their perceptions of the classroom goal structure. Multilevel analyses show that the effect of classroom mastery goal structure on enjoyment, anger and boredom is mediated by studentís mastery goal whereas the effect of classroom performance goal structure on enjoyment and anger is not mediated by any studentís achievement goals. These results underline the relevance to consider simultaneously personal goals and classroom goal structures. In a practical point of view, these results mainly support the pertinence of classroom mastery goal structure to improve studentsí emotional well-being.

Processes of students' competence, engagement and motivation: A multivariate dynamic factor analysis

Quantitative methods,Self-regulation,Primary education,Learning in context

Lars-Erik Malmberg, University of Oxford, United Kingdom;

There is abundant literature on the interrelations between, and longitudinal change in studentsí competence beliefs, engagement and motivation. Less is known about how students experience shorter term fluctuations and stability in these cognitions and behaviors in real-time. In our ecological momentary assessment study, we investigated how processes of competence, engagement and motivation were experienced by students. 314 primary school studentsí (Years 5 and 6) completed the Learning Experience Questionnaire (LEQ; perceived competence, effort exertion, and intrinsic and extrinsic motivation) in Personal Digital Assistants (PDAs), on average 11.2 learning episodes (SD = 4.8; Range = 1-29; nepisodes = 3,532) during one week at school. In order to explicitly investigate the chronological order of events we specified multivariate dynamic factor analyses using multilevel structural equation models (MSEM) for investigating lagged relationships between experiences at time T and the preceding time-point T - 1. Extrinsic motivation was the most stable (autoregressive coefficient) over time, intrinsic motivation next most stable, competence belief and effort exertion less stable. Within each time-point intrinsic (but not extrinsic) motivation was related to effort and competence beliefs. Overall the use of user-friendly technology for data-collection and state-or-the-art quantitative models provides an important window into studentsí experiences of learning processes.

Multilevel analysis of academic peer motivational climate and achievement goal orientations

Quantitative methods,Teaching/instruction,Goal orientation,Primary education,Motivation and emotion

Nir Madjar, Bar-Ilan University, Israel; Melissa Karakus, Temple University, United States;

Achievement goals are consistently found important for understanding many educational processes, such as learning strategies, well-being and achievement. Previous studies identified teachers' practices that promote adaptive achievement goals, whereas less attention was given to the aspect of academic peer motivational climate. The current study aimed to explore the relationships between individual achievement goals and dimensions of academic peer motivational climate, defined as students' perceptions of their classmatesí attitudes and behaviors toward learning assignments in school. This climate consisted of supporting each other's improvement, encouraging effort in learning, promoting sense of relatedness, and conflict behaviors in reactions to failure. We hypothesized that positive aspects of peer motivational climate would be associated with mastery goals, and negative aspects with performance goals. Participants were 596 middle- and high-school students in Israel who completed self-reported surveys. Primary analysis supported the construct validity and reliability of academic peer motivational climate. Further analyses, including hierarchical linear modeling (HLM) revealed that mastery goals are associated with classroom-level support in improvement (i.e., explained by level-2), and performance-approach and avoidance with individual-level of perceived conflict (i.e., explained by level-1). All findings were robust when controlling for teacher goal emphasis, gender, age and prior achievements in school. Teacher and educational practitioners are advised to consider academic peer motivational climate, on both general classroom level and individual level perceptions.

Using Biopsychological Evidence to Inform Motivation for Learning

Neuroscience,Synergies between learning, teaching and research,Emotion and cognition,Motivation and emotion

Bobby Hoffman, University of Central Florida, United States;

The relationship between human neuroanatomy and selected motivations that underlie learning and performance are often neglected in educational psychology research. Strong multi-disciplinary evidence reveals that incremental changes within the human nervous and endocrine systems are highly correlated with organized and motivated behavior. The field of biopsychology (BP) has emerged, revealing the precise etiology of the behavioral expressions triggered by physiological events. Despite evidence, relevant BP findings fail to be adapted by educators. As such, this paper emphasizes the practical value of using BP knowledge to understand learner motivation, along with guidelines for analyzing BP data. In this full-paper extraction, the selective biological correlates of power, affiliation, and achievement are discussed as a means to promote adaptive motivation and inform pedagogical practice.

Gender differences in trajectories of middle school students' motivation in mathematics

Quantitative methods,Organization of educational research(sounds strange),Developmental processes,Mathematics,Secondary education,Motivation and emotion

Natalie Vannini, Goethe-University Frankfurt, Germany; Barbara Otto, Goethe-Universitat Frankfurt, Germany;

Many empirical studies reveal that there is a significant decrease of intrinsic motivation to learn mathematics during middle school years. Other findings also confirm that gender differences exist regarding students' motivation for mathematics. Thus, the current study aims at (A) replicating the negative trend of students' motivation during middle school years; (B) investigating gender differences in students' motivation; and (C) analyzing gender to be a moderator for the development of students' motivation during middle school years. Based on Self-Determination Theory (Deci & Ryan, 1985; 2000) a cross-sectional study was conducted which assessed data of 795 middle school students attending 5th, 7th, and 9th grade. Students answered a questionnaire which asked for students' self-efficacy, autonomous motivation, and controlled motivation as well as students' basic psychological need satisfaction (autonomy support, competence support, relatedness) by their math teachers. In order to answer the research questions multivariate analyses of variance were conducted using grade level and gender as independent variables as well as overall students' motivation and overall students' basic psychological need satisfaction, respectively, as dependent variables. Results confirmed the formerly shown drop in students' autonomous motivation and self-efficacy over middle school years as well as a gender difference in the same variables showing girls to be less autonomously motivated and feeling less competent. However, the interaction (grade level x gender) of overall motivation was not significant. Moreover, none of the analyses showed significant differences for overall students' basic psychological need satisfaction. Implications for further research as well as practical applications are discussed.

L 15

28 August 2015 15:45 - 17:15

Room Green_A4

Thematic Poster

Online learning/e-learning

Technology integration and online learning/e-learning

Keywords: Design based research,Assessment methods and tools,Educational technology,Professions and applied sciences,E-learning/ Online learning,Higher education,Educational policy,Reflective society,At-risk students,Attitudes and beliefs,Competencies,Developmental processes,Learning analytics,Student learning,Teaching/instruction,Comprehension of text and graphics,Reading comprehension,Self-regulation,Technology,Computer-assisted learning

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 16 - Metacognition,SIG 2 - Comprehension of Text and Graphics,SIG 7 - Learning and Instruction with Computers

Chairperson: Antonia Scholkmann, University of Hamburg, Germany

Online peer discussion, endorsement, & promotion: An alternative to peer & portfolio assessment

Design based research,Assessment methods and tools,Educational technology,Professions and applied sciences,E-learning/ Online learning,Higher education

Daniel Hickey, Indiana University, United States; Joshua Quick, Indiana University, United States; Tara Kelly, Indiana University, United States;

Participatory approaches to learning and assessment were used to design a ìbig open online courseî on Educational Assessment. Central to this effort were ìlevelsî of assessment innovations designed to support individual and social engagement with disciplinary knowledge, understanding of disciplinary concepts, and achievement of disciplinary standards. Together, the innovations promised to accomplish the goals of peer assessment and portfolio assessment while avoiding many of the challenges they present. The course featured personalized learning contexts and weekly ìwikifoliosî that were viewable by all participants. To informally support engagement, the wikifolios featured peer questioning, commenting, endorsement, and promotion (but not peer assessment). To support semi-formal accountability, responses to reflection prompts were formally graded for the students who completed the course for university credit; no other elements or interactions were evaluated. Formal accountability was accomplished via conventional time-limited multiple choice exams and evidence-rich open digital badges for completing units and the course. Results across two courses confirmed dramatically higher levels

of disciplinary engagement than usually attained in open or conventional online courses. In both courses, weekly wikifolios averaged over 1000 words (essentially all disciplinary engagement). In the first course, 93% of the discussion posts concerned the topic of the assignment and 46% referenced personalized learning context. In the second course (which included four new features), wikifolios and comments were significantly lengthier. The same high level of disciplinary engagement was attained (92%) but requiring peer questions appeared to drop the references to personalized context to 24%. Exam scores averaged around 80% in both classes.

Modeling technology-mediated informal learning in the context of activating disadvantaged youth

Educational policy,Reflective society,At-risk students,Attitudes and beliefs,Competencies,Developmental processes

Paulo Moekotte, Open University of the Netherlands, Netherlands; Henk Ritzen, Applied University Edith Stein, Netherlands; Saskia Brand-Gruwel, Open University, Netherlands; P. Robert-Jan Simons, Netherlands School of Educational Management, Netherlands;

This article stresses the importance of technology-mediated informal learning by disadvantaged, low-educated youth through the use of social media and social networks in the context of enhancing social and economic participation in order to fully develop the potentials of participation. We propose a conceptual model incorporating technology-mediated informal learning and development tasks, to compensate for the limited structuralizing views on cultural and social participation held by traditional regulators of welfare to work schemes and projects, including formal education. The developmental tasks consist in ëselective self-presentationí, ëinformational availabilityí, ëexplicit participationí and ënetwork socialityí. This model is meant to inform policies on individualizing activation approaches from a technology-mediated informal learning perspective.

Novice's performance on hypertext and traditional texts: Designing for comprehension

Learning analytics,Student learning,Teaching/instruction,Comprehension of text and graphics,Reading comprehension,E-learning/ Online learning

Alvaro Janez, Universidad de Salamanca, Spain; Javier Rosales, Universidad de Salamanca, Spain;

Novices are believed to have disorientation problems in hypertext, leading to poor comprehension and performance. We wanted to show that novices can actually perform in hypertext at the same level than when using traditional paper texts, as long as the hypertext is carefully designed to facilitate navigation. We asked a sample of undergraduate students (N = 90) with low topic knowledge to read the same hypertext under different reading goals, and compared their performance to a control group (N = 90) performing the same tasks using a printed version of the material. Results showed that subjects had similar performance in both hypertext and paper texts, across all the reading goals manipulated (test taking, summary writing,

elaborative interrogation, reading from a perspective, searching for detailed information, or searching for general information). Implications for research and education are discussed.

Studentsí interaction parameters within LMSs and their relationship with achievement

Learning analytics,Educational technology,Self-regulation,Technology,Higher education,Computer-assisted learning

Rebeca Cerezo, University of Oviedo, Spain; Miguel Sanchez-Santillan, University of Oviedo, Spain; Jose Carlos Nunez, University of Oviedo, Spain; Puerto Paule, University of Oviedo, Spain; Natalia Suarez-Fernandez, University of Oviedo, Spain;

The use of learning management systems (LMSs) has grown exponentially in recent years and currently has a strong effect on the teaching-learning process, particularly in higher education. The present work tends to shed light in this issue from an EDM (educational data mining) approach, extracting different groups of students with similar behaviors from Moodle logs and matching those behaviors with different levels of general achievement. First, the different patterns of studentsí involvement in the learning process in an LMS were clustered. Second, the relationship between those patterns and studentsí general achievement was examined. After analyzing the log data gathered from a Moodle 2.0 course in which 140 undergraduate students were enrolled, four different patterns of learning with different general achievement were found. Theoretical and educational significance is discussed further.

L 16

28 August 2015 15:45 - 17:15

Room Brown_B1

Thematic Poster

Self-regulation

Self-regulation

Keywords: Student learning,Peer interaction,Self-efficacy,Self-regulation,Higher education,Motivation and emotion,Qualitative methods,Interdisciplinary,Quantitative methods,Social sciences,Primary education,Content analysis,Assessment methods and tools,Social aspects of learning,Social interaction,Workplace learning,Design based research,Achievement,Developmental processes,Goal orientation,Learning and developmental difficulties

Sig's: SIG 1 - Assessment and Evaluation,SIG 10 - Social Interaction in Learning and Instruction,SIG 14 - Learning and Professional Development,SIG 16 - Metacognition,SIG 4 - Higher Education,SIG 8 - Motivation and Emotion

Chairperson: Barbara Arfe, University of Padova, Italy

The Relationship between Self-Regulated Learning and Socially Shared Regulation of Learning

Student learning,Peer interaction,Self-efficacy,Self-regulation,Higher education,Motivation and emotion

Takamichi Ito, Kyoto University of Education, Japan;

This study aimed to examine the relationship between self-regulated learning and socially shared regulation of learning in peer learning. Peer learning should improve studentsí self-regulated and socially shared regulation of learning, but there is little research. In addition, socially shared regulation of learning would be connected with some psychological factors such as belief in cooperative learning, academic help-seeking, and peer modeling orientation. This study explored these relationships through the implementation of the method of reciprocal peer tutoring in an educational psychology class. One hundred thirty Japanese university students took classes including peer tutoring sessions for four months and completed questionnaires. Classes of ninety minutes contained three peer tutoring sessions in which a pair of students explained learning materials and taught each other by turns in about ten minutes. Self-regulated learning was measured with the MSLQ. Socially shared learning strategies contained ìsocially shared cognitionî, ìsocially shared monitoringî, and ìsocially shared effort regulationî. As a result, three socially shared learning strategies were positively related to self-efficacy, intrinsic value, their motivation for peer learning, and the four self-regulated learning strategies. But, their motivation for peer learning was not associated with self-regulated learning strategies. These findings suggest that self-regulation and socially shared regulation are independent and these motivational factors are different in peer tutoring. Also, ìsocially shared monitoringî and ìsocially shared cognitionî were negatively associated with ìdependent help-seekingî and positively associated with ìadaptive help-seekingî. These results implicate that socially shared regulation of learning in cognitive aspects is more significant in peer learning processes.

Supervisorsí interventions to promote self-regulated learning in undergraduate research

Qualitative methods,Self-regulation,Interdisciplinary,Higher education

Mayke Vereijken, ICLON, Netherlands; Roeland M. Van der Rijst, ICLON-Leiden University Graduate School of Teaching, Netherlands; Jan van Driel, Leiden University, Netherlands; Friedo W. Dekker, Leiden University Medical Center, Netherlands;

Although undergraduate students are excited about early involvement in student research projects, they experience difficulties regarding monitoring their learning process. Also, supervisors find it hard to adapt to studentsí needs with regard to the central goal of undergraduate research projects; completing a bachelorís thesis of sufficient to high quality. The problem addressed in this project involves the way in which supervisors provide adaptive support and promote studentsí self-regulated learning (SRL) strategies in research. Recent explorative studies into thesis supervision suggest a rather complex interplay of supervisor-

student interactions. The central research theme is how supervisors use diagnostic and intervention strategies in supervision meetings as well as throughout the supervision process to (1) adapt to studentsí needs and (2) to promote SRL in undergraduate research projects doing video-observations and interviews.

Self-regulated skills during homework in primary school: A learning diary study

Quantitative methods,Student learning,Self-regulation,Social sciences,Primary education,Motivation and emotion

Valerie Thomas, Vrije Universiteit Brussel (VUB), Belgium; Hilde Van Keer, Ghent University, Belgium; Sabrina Vandevelde, Ghent University, Belgium; Jeltsen Peeters, Vrije Universiteit Brussel, Belgium; Ankelien Kindekens, Vrije Universiteit Brussel, Belgium; Free De Backer, Vrije Universiteit Brussel, Belgium; Koen Lombaerts, Vrije Universiteit Brussel, Belgium;

Self-regulated learning (SRL) becomes increasingly important in education and can be effectively stimulated by teachers. Under certain conditions, homework is perceived facilitative for studentsí SRL development. Nonetheless, only few studies investigate SRL in the context of primary school homework. Hence, the present study aims to depict primary studentsí use of SRL strategies during their homework. Moreover the study is an intervention study that examines the role of learning diaries and teacher feedback on studentsí SRL development. This is studied making use of a learning diary approach and self-report questionnaire (CP-SRL). In total, 30 sixth graders of primary education in Flanders (Belgium) participated. The respondents were divided into three groups. Students of the first group (n=18) filled out a learning diary during three weeks and received three times a week teacher feedback on their learning process, based on their diary notes. Students belonging to the second conditional group (n=6) composed a learning diary without obtaining feedback. Students who were assigned to the third condition (n=6) kept no learning diary. The research results show that students make quite extensive use of self-regulatory strategies during their homework. Slightly increasing trends in the use of SRL strategies are observed when the teacher is providing feedback on the learning diaries. However, keeping a learning diary and the teacherís feedback on the learning process appear to have only a limited effect on the degree of studentsí SRL.

The interplay between self- and social regulation in teams

Content analysis,Assessment methods and tools,Self-regulation,Social aspects of learning,Social interaction,Workplace learning

Marijn Wijga, University of Twente, Netherlands; Maaike Endedijk, University of Twente, Netherlands; Peter Sleegers, Twente University, Netherlands;

Research has suggested that the regulation of learning processes in teams is a key factor in enhancing team and organizational innovativeness. The present study explores the different combinations of (self- and social) regulatory processes that take place during team work and how teams differ in the quality of these regulation processes. We investigated the regulation processes of 10 teacher teams from one Dutch university that are implementing a new curriculum.

Observations of team meetings were used to measure the interaction between self- and social regulated learning of team members in the context of a university curriculum innovation. The poster will display an adequate and valid analysis tool with which the performance of teams can be explained based on the occurrence of different types and combinations of regulation processes during team meetings. This will be illustrated with empirical evidence. In addition, the results will show whether the expected occurrence of the four types of regulation activities (ignored, accepted, shared, and co-constructed) is reflected by the data.

Types of Promotion-oriented versus Prevention-oriented Self-Regulation, precursors and outcome

Design based research,Assessment methods and tools,Achievement,Developmental processes,Goal orientation,Self-regulation

Diana Klinger, University of Vienna, Austria; Brigitte Rollett, Universitat Wien, Austria; Arnd Florack, University of Vienna, Austria; Peter Muehlbauer, University of Vienna, Austria; Wolfram Rollett, University of Education Freiburg , Germany;

In his Regulatory-Focus-Theory E.T. Higgins postulated two RF-types characterized by either ìPromotion-î or ìPrevention-orientedî self-regulation. The aim of this presentation is to investigate whether these exist, using the data of the longitudinal study ìFamily Development in the Course-of-Lifeî(N=175 families; t1: 6th month pregnancy; t2: childís age 3 months; t3: 3 years; t4: 8; t5: 11; t6: 15; t7: 18; t8: 22 years, N=141 families) and employing Lockwood/s General-Regulatory-Focus-Measure. Regression analysis with Promotion-oriented SR as dependent variable (R2=.291) evinced significant results for anger (t4, Beta=.308, p=.001), conscientiousness (t6, Beta=.316, p=.001), experiential openness (t7, Beta=.243, p=.014). Results with Prevention-oriented-SR (R2=.314): birthweight (Beta=-.260, p=.003), anger (t4, Beta=.202, p=.030). Clusteranalysis led not to two, but four SR-clusters. Subjects typically employed both Pro-SR and Pre-SR, but differed significantly in extent and proportion of their usage (Pro-SR: F=21.490, p=.000; Pre-SR: F=206.538, p=.000): Clusters 2 and 4 differed in extent of Pro-SR (Cl2: middle, Cl4: high-level) but had characteristically low scores in Pre-SR. Clusters 1 and 3 used Pro-SR and Pre-SR in a balanced way (Cl1: middle, Cl3: high-level). Already at t5, the later RF-Groups differed in their scholastic achievements (German: F=3.86, p=.011; Mathematics: F=4.35, p=.006; English: F=2.60, p=.056). The most favourable results were achieved by the students in the high-level Pro-SR Cluster 4, the least favourable in the high-level balanced Cluster 3. Clusters 1 and 2 held middle positions. This general pattern continued throughout all waves and the additional variables studied. The consequences of these results for RF-theory and intervention will be discussed in the presentation.

Relation between help-seeking from social sources and the quality of student-teacher relationship

Developmental processes,Learning and developmental difficulties,Self-regulation,Social aspects of learning

Catherine Gosselin, University of Quebec in Montreal, Canada; Julien Mercier, University of Quebec in Montreal, Canada; Frederic Legault, Universite of Quebec in Montreal, Canada;

Seeking help from the social environment is a critical aspect of studentsí achievement. While social cognitive theory characterizes help-seeking as a behavioral strategy, attachment theory categorises it as an affective one. Thus, help seeking can be tributary of the quality of the student-teacher relationship. The aim of this study is to examine the relation between quality of student-teacher relationship and student propensity to seek help from various persons (i.e. teacher, peers, parents or no one) according to their grade level (3 to 6th grade). Results show that student-teacher quality of attachment is related to studentsí tendency to seek help from various sources and that sources of help students rely on and student-teacher positive relationship evolve throughout schooling. These results illustrate the importance of developing a positive student-teacher relationship and point to emotional and contextual factors related to fostering the ability to seek help.

L 17

28 August 2015 15:45 - 17:15

Room Brown_B3

Thematic Poster

Technology-enhanced learning

Technology-enhanced learning

Keywords: Qualitative methods,Science education,Primary education,Inquiry learning,Learning in context,Multimedia learning,Case studies,Educational technology,Learning approaches,Higher education,Computer-assisted learning,Mixed-method research,Teaching/instruction,Quantitative methods,Conceptual change,Pre-service teacher education,Social interaction,Interdisciplinary,E-learning/ Online learning,Computer-supported collaborative learning,Experimental studies,Self-regulation,Reading comprehension,Secondary education

Sig's: SIG 11 - Teaching and Teacher Education,SIG 20 - Computer Supported Inquiry Learning,SIG 6 - Instructional Design,SIG 7 - Learning and Instruction with Computers

Chairperson: Anniken Furberg, University of Oslo, Norway

Learning with tablet-cloud systems in elementary science education

Qualitative methods,Science education,Primary education,Inquiry learning,Learning in context,Multimedia learning

Charles Max, University of Luxembourg, Luxembourg;

The present study analyses the use of tablet-cloud systems in the elementary science classroom, i.e. to what extent do these technologies facilitate learner-led inquiries, shape learning processes and the collaborative understanding of scientific phenomena. After proliferating in everyday contexts, high-performing mobile devices are currently entering school environments. With their impressive range of digital features, they allow to capture, collect, treat and visualize multimodal data related to own inquiries. Specific apps enable students to merge these data with content they download from digital sources and to share their final creations with the school community through a school-based cloud system. Evidence is gathered through different kinds of data, collected by students on the internal cloud (multimodal classroom productions, self-recordings about their learning and inquiry approaches) and the research team when visiting the project classrooms (video data from science lessons, video-stimulated recall interviews with students). The study reveals that students quickly acknowledge the potential of these devices for documenting their science investigations, gathering information, (re)-evaluating own explanations, communicating inquiry results or reflecting on their learning. The research team evidences an increase of self-directed, inquiry-oriented and interest-driven learning processes. The table-cloud systems stimulate studentsí engagement and self-expression, i.e. explanations from self-collected evidence, increased argumentation and evidence-based justification of own approaches. The interactive technologies also trigger new forms of group exchange and feedback, responsibility for collaborative work and awareness of quality criteria for own achievements.

Web-based learning environments for the development of decision making skills in higher education

Case studies,Educational technology,Learning approaches,Science education,Higher education,Computer-assisted learning

Irene Lambrou, Cyprus University of Technology, Cyprus; Iolie Nicolaidou, Cyprus University of Technology, Cyprus;

While the adequacy of decision-making skills has been identified as an essential aim of Environmental Education, it seems that even adults face difficulties in developing reasoned argumentation and in applying decision-making strategies to solve socioscientific issues. Specifically, it seems that the competence in reasoning argumentation and decision-making does not come as a natural outcome of formal education, therefore specialized instruction is needed. Empirical data about teaching innovations that aim to develop decision making skills are limited in higher education. The focus of this pre-post test case-study is to examine the impact of an intervention based on a web-based learning environment on the development of decision making skills through optimization, of undergraduate Environmental Science Students of a public university. The method of optimization involves a process in which multiple criteria with different weights are evaluated simultaneously for the most appropriate solution to be chosen. A specially designed web-based learning environment was created and implemented through a problem based learning approach in the context of this study with 20 undergraduate students over one hour. A preliminary pre-post-test analysis of studentsí answers in two open-ended decision making tasks through a paired samples t-test indicated significantly better results in post-tests in undergraduate students decision making skills, $t(19) = -3.92$, $p=.001$. These preliminary findings

indicate that an instructional intervention through a learning environment, based on problem based learning was successful in developing studentsí decision making-skills and suggest that web-based instruction could be beneficial for the improvement of high-order thinking skills such as decision-making skills.

Designing for Complex Systems in the Science Classroom: Context, Teachers, and Student Learning

Mixed-method research,Teaching/instruction,Science education,Learning in context

Susan Yoon, University of Pennsylvania, United States; Eric Klopfer, MIT, United States; Sao-Ee Goh, University of Pennsylvania, United States; Josh Sheldon, MIT, United States; Ilana Schoenfeld, MIT, United States; Daniel Wendel, MIT, United States; Hal Scheintaub, MIT, United States; Emma Anderson, University of Pennsylvania, United States; Jessica Koehler, University of Pennsylvania, United States; Joyce Wang, University of Pennsylvania, United States; Murat Oztok, University of Lancaster, United Kingdom; Chad Evans, University of Pennsylvania, United States;

In this paper, we respond to a gap in the research on K12 science education through complex systems approaches that describes design features for classroom implementation, and considers the role of the teacher in influencing the success of the complex systems reform. We present a curriculum and instruction framework that outlines how teaching and learning about complex systems in high school science classroom contexts can be done. We articulate the features of the framework and provide examples of how the framework is translated into practice. We follow with evidence from an exploratory study conducted with 10 teachers and over 300 students aimed at understanding change in teacherís instructional practices; the extent to which students learned from the activities; what teachersí perceptions were in terms of utility and usability; and what other supports teachers needed?

Trajectories for Engaged Learning about Complex Systems in a Technology-Rich Learning Environment

Quantitative methods,Educational technology,Conceptual change,Science education,Inquiry learning

Cindy Hmelo-Silver, Indiana University, United States; Suparna Sinha, Rutgers State University of New Jersey, United States; Toni Rogat, Purdue University, United States; Rebecca Jordan, Rutgers University, United States; Catherine Eberbach, National Science Foundation, United States;

Systems thinking is an important crosscutting aspect of science learning (NRC, 2012). Little research has examined what affects studentsí learning trajectories for complex systems in a technology rich learning environment. Our aim here is to examine how studentsí collaborative engagement in a technology-rich learning environment affects how they learn systems concepts. Here we bring together research that bridges processes of engagement with a microgenetic analysis of studentsí systems learning trajectories (Chinn, 2006) in a technology-rich learning

environment. This study is part of a 6-7 week technology-intensive units that target middle school students' understanding of aquatic ecosystems. Students collaborated in small groups to investigate problems related to aquatic ecosystems. Simulations and modeling tools afforded opportunities for students to use the CMP framework to understand dynamic processes, and create models of their evolving understanding. The results indicate that the quality of group engagement predicts individual learning trajectories.

ìSchool on Campus - Onlineî ñ An innovative concept to link theory and praxis in teacher education

Mixed-method research,Pre-service teacher education,Social interaction,Interdisciplinary,E-learning/ Online learning,Computer-supported collaborative learning

Dominik Leiss, Leuphana Universitat Luneburg, Germany; Julia Drexhage, Leuphana Universitat Luneburg, Germany;

To connect the Leuphana University of Luneburg with a classroom in a secondary school a videoconference system was installed in both institutions. It is the universityís goal to let the pre-service teachers experience subject didactics as well as pedagogical and psychological concepts in an actual classroom context. The main idea is to make students look into a subject theoretically and then to observe a real lesson based on that knowledge live via videoconference. All parties involved (university students, lecturers, pupils and teachers) can reflect on and discuss the observations afterwards. By doing so the system enables coaching possibilities and further training for teachers involved in the cooperation. To find out how the different parties involved think about the usefulness and effectiveness of the work with the videoconference system, university students, lecturers, pupils and teachers having taken part in a cooperation course (a sample of 115 persons in total) were asked to fill out a questionnaire and to take part in an interview study (university students only). Compared to teaching videos working with the videoconference shows specific advantages like contextualized learning and a common exchange of knowledge, observations and impressions.

Efficacy of feedback to improve procedural and declarative knowledge of reading literacy strategies

Experimental studies,Educational technology,Self-regulation,Reading comprehension,Secondary education,Computer-assisted learning

Maria-Angeles Serrano, University of Valencia / Interdisciplinary Research Structure for Reading Research (ERI Lectura), Spain; Carmen Candel, ERI Lectura, University of Valencia, Spain; Eduardo Vidal-Abarca, Universidad de Valencia, Spain; Ignacio Manez, Interdisciplinary Rsearch Structure for Reading Research (ERI Lectura), Spain;

Strategic what, how and when reading behaviors are a crucial factor when students are required to answer questions. Previous research in elaborate feedback on reading strategies has demonstrated that feedback is useful to improve performance and an effective manner to learn and apply new reading strategies in task-oriented reading scenarios. For this study forty-four

secondary students were randomly assigned into three conditions during training and a transfer phase: two-selection-attempts condition vs. one-selection-attempt condition vs. control. Experimental conditions were analyzed in order to define which of both procedures better encourage students into a significant change on reading strategies in a transfer phase when no-feedback is provided. Results showed that, although students who were involved in a second-selection-attempt seemed to process the textual information deeply, so that they improved their performance, one-selection-attempt students also improved regards to the control condition. Regarding strategic reading behavior, data shows that both experimental groups increased the quantity and quality of their searches. However, a second-selection-attempt helps students to recognize relevant information for the task compared to one-selection-attempt. In addition, students in both experimental conditions showed to be more aware of their strategic reading learning process.

L 18

28 August 2015 15:45 - 17:15

Room Brown_B2

Thematic Poster

Writing

Writing

Keywords: Qualitative methods,Student learning,Literacy,Writing/Literacy,Secondary education,Multimedia learning,Primary education,Experimental studies,Special education,Language (L1/Standard Language),Parental involvement in learning

Sig's: SIG 12 - Writing

Chairperson: Carla Firetto, The Pennsylvania State University, United States

Digital composition and metalinguistic reflection in secondary school writers

Qualitative methods,Student learning,Literacy,Writing/Literacy,Secondary education,Multimedia learning

Annabel Watson, University of Exeter, United Kingdom;

This exploratory study aims to investigate the relationship between the affordances of traditional and digital writing platforms, and adolescent studentsí metalinguistic understanding of the choices available to them as writers. While the dissonance between the prevalence of ìtechnology-basedî out of school writing practices (Clark 2013:8), and the tendency of ëschool literacyí to privilege traditional monomodal forms (Merchant 2013) is evident internationally (Rowsell & Casey 2009), the impact that writing on digital platforms may have on student

thinking about language has been addressed largely in a speculative manner (e.g. Gustafson 2013). This poster will report on a pilot study undertaken to develop and refine methodological approaches to examining the metalinguistic activity of secondary school writers, as well as to provide preliminary indications of the ways in which student thinking about language can be activated by different types of writing. Secondary school students in the UK were recorded composing different types of texts in pairs (handwritten and online character profiles), and their discussion was analysed to examine the metalinguistic understandings shown. Post-writing interviews which prompted students to reflect on the choices they made as writers also elicited metalinguistic reflection, along with their perceptions of the linguistic and modal affordances of the text types produced. The anticipated results will contribute to the development of a theoretically grounded approach to integrating digital technology and multimodal composition into writing instruction by illuminating the ways in which studentsí understanding of the choices available to them as writers is developed by different technologies and modes of composition.

Thinking allowed? Facilitating high-level thinking about grammar in the writing classroom

Qualitative methods,Student learning,Literacy,Writing/Literacy,Primary education

Anthony Wilson, University of Exeter, United Kingdom;

Since the rediscovery of the work of Vygotsky (1978) there has been a widespread acceptance that learning is a situated and culturally mediated process, chiefly through the ëtoolí of language. Recent studies (Myhill et al, 2012) have underlined the importance of teachersí linguistic subject knowledge in mediating metalinguistic knowledge in the writing classroom, and that of pedagogical content knowledge over content knowledge (Myhill et al, 2013), for example in handling discussion and questions about grammar. Teachersí low levels of grammar knowledge therefore create problems for teachers and learners alike (ibid). This paper draws on data from a national study of teachers in 54 schools across England, and which set out to investigate whether drawing attention to specific grammar features during the teaching of writing might help raise student attainment in writing for primary children aged 10-11. The research data collected included observations and audio data from 54 lessons, focussing on the nature of the metalinguistic discussion. The data analysis process was inductive. An initial stage of open coding following the constant comparison method, generated a first set of codes. These were then axially coded into thematic groups. This study demonstrates how successful teaching of embedded grammar knowledge occurs when teachers facilitate classroom interaction which is characterised by learners being given the opportunity to articulate and examine their own knowledge of grammar.

Dictation - To what extent could it facilitate writing for poor spellers?

Experimental studies,Special education,Literacy,Language (L1/Standard Language),Writing/Literacy,Primary education

Asa Wengelin, University of Gothenburg, Sweden; Lisa Bengtsson, University of Gothenburg, Sweden; Sanna Kraft, University of Gothenburg, Sweden; Victoria Johansson, Lund University, Sweden;

In Sweden, just as in many other countries, schooling beyond the first few years incorporates aspects of writing in almost every activity. Thus from an educational point of view it is important to understand how we can facilitate writing and writing development for all children,. Most models of writing development assume that children need to automatize transcription skills such as handwriting or typing and spelling in order to free up cognitive resources for the production of coherent text A frequently raised question is whether dictation could also fulfil this function. In this study we investigate the relation between spelling skills and linguistic characteristics of texts produced by means of typing and by means of dictation by 39 Swedish 5th-graders. Quantitative analyses of the texts revealed that spelling skills did indeed correlate with text quality in the typed texts leading us us to expect that dictation could facilitate writing for children in this stage of writing development. However no differences between the typed and dictated texts were found for either text length, text quality or syntactic complexity. We are currently carrying out more detailed qualitative and quantitative analyses of the texts and we are specifially focussing on the texts produced by the poorest spellers in order to find out to whether and to what extent they benefited from the dictation condition even if this wasnít the case for the group as a whole.

Fostering Parents Involvement in Writing: Empirical Test of the Program Cultivating Writing

Experimental studies,Literacy,Parental involvement in learning,Writing/Literacy

Ana Camacho, University of Porto, Portugal; Rui Alexandre Alves, University of Porto, Portugal;

Learning to read and write efficiently is of the utmost importance in elementary school. Writing is highly demanding (Flower & Hayes, 1980; Kellogg, 1994) and can be very demotivating for beginning writers (Boscolo & Hidi, 2007). Several studies showed that parents involvement influence childrenís competence and motivation in reading, but little is known about parent involvement in writing (Saint-Laurent & Giasson, 2005; Wollman-Bonilla, 2001). The main purpose of the current research was twofold: first, to develop an intervention program promoting parentsí involvement in writing, second to test its efficacy over two empirical studies. In Study 1, five Portuguese classes of second graders (7 years old) were assigned to two groups: one experimental and a waiting list. Parents in the experimental group, attended the program ìCultivating Writingî. During the intervention, parents trained a parent-child interaction, in which they learnt to make effective suggestions and to praise their childrenís texts. Over ten weeks, teachers asked the students to write four texts as homework. Parents in the intervention interacted with their children in accordance with the prescribed sequence. Childrenís writing skills and their attitude towards writing were assessed at a pretest and posttest evaluation. This procedure was repeated in the second study. Overall, the results in the two studies showed that the parental program improved some of the childrenís writing skills, specifically reflected in better text quality. The findings of this work highlight that some relational aspects of writing, namely parentsí warm environment, suggestions, and praises seem to foster their childís writing skills.

28 August 2015 15:45 - 17:15

Room Blue2_D2

Round Table

Inquiry learning

Inquiry learning and researchers in science

Keywords: Experimental studies,Teaching/instruction,Metacognition,Science education,Secondary education,Inquiry learning,Researcher education,Interdisciplinary,Doctoral education,Design based research,Mixed-method research,In-service teacher education,Reflection

Sig's: SIG 11 - Teaching and Teacher Education,SIG 16 - Metacognition,SIG 24 - Researcher Education and Careers

Chairperson: Annelies Raes, Ghent University, Belgium

Science Education at school towards Scientist at work

Experimental studies,Teaching/instruction,Metacognition,Science education,Secondary education,Inquiry learning

Marion Crauwels, KU Leuven, Belgium; Ilya Lebeau, KU Leuven, Belgium; Sofie Baeten, KU Leuven, Belgium; Carla Schramme, KU Leuven, Belgium; Daan Moechars, KU Leuven, Belgium; Filip Dochy, KU Leuven, Belgium;

A successful implementation of the Science, Technology, Engineering and Mathematics (STEM) learning reform, one of the recent proposed reforms in secondary science education, demands a supporting pedagogy. Mastering these domains requires technical skills and in addition conceptual understanding. The proposed research project on a student-centred STEM learning environment that comprises elements such as guided-inquiry hands-on lab-experiences with a special focus on instruction supporting the development of cognitive and metacognitive processes intends to contribute in shaping that pedagogy. The goal of the guided-inquiry lab-based (GILB) STEM learning environment is to enhance studentsí achievement concerning the nature of science (NOS), scientific processes, scientific knowledge and interest in STEM-subjects and STEM-related careers. Four learning groups were investigated: (a) a guided-inquiry lab-based environment with metacognitive support (GILB-STEM + META); (b) a guided-inquiry lab-based environment with no metacognitive support (GILB-STEM); (c) a cookbook-inquiry environment with metacognitive support (CB-STEM + META); and (d) a cookbook-inquiry with no metacognitive support. Participants were 12th-grade senior high school students with the subjects science and math as a major part of their curriculum. Results indicate that the GILB-STEM + META learning group outperformed all other research groups, and the CB-STEM learning group students acquired the lowest mean scores. The use of guided-inquiry lab-experiences combined with metacognitive support enhances studentsí performances.

Preparing scientific researchers: Problems facing research methods instruction

Researcher education,Teaching/instruction,Interdisciplinary,Doctoral education

Gavin Brown, The University of Auckland, New Zealand; Barbara Moschner, Universitat Oldenburg, Germany;

The development of research scientists requires substantial development of skills and competencies in data collection, analysis, and design. In the fields of educational sciences and social sciences multiple research methods are prevalent which poses a substantial problem for the training of future independent researchers. There is general agreement that doctoral students require (1) a broad panoply of technical skills and (2) mature levels of self-regulation and interpersonal skills to function as research scientists. Agreement on these issues does not easily translate into an effective curriculum for research methods. Especially, the second dimension - the intra- and inter-personal skills -may not be amenable to programmatic instruction. This roundtable aims to discuss the challenges research methods instruction faces in ensuring research scientists in their doctoral education receive adequate, broad, and in-depth training. Participants will be asked to share their own experience and insights into effective research methods instruction that may help in the design of appropriate research methods instruction.

Learning, Teaching and Research in an inquiry-based learning environment with students at University

Design based research,Mixed-method research,In-service teacher education,Reflection,Interdisciplinary,Inquiry learning

Catherine Naepflin, Padagogische Hochschule, Switzerland; Jurg Aeppli, Padagogische Hochschule Luzern , Switzerland;

Inquiry-based learning plays an increasingly important role when it comes to the ability of individuals to continually educate themselves, think critically, and generate or question new ideas (Hutchings, 2007). Also, in teacher education the term ìsustainableî learning occurs more often. There is a shift observed moving from teachers as ìknowledge usersî toward ìknowledge makersî that means students from University of Teaching Education take an inquiring stance to ongoing pedagogical questions. The main purpose of this project is to offer an inquiry based-learning environment on three different levels namely for students, pupils, and the lecturer. Students got prepared for this task in a module on inquiry-based learning held at the University of Teacher Education in Lucerne with ongoing lecturer support while fostering inquiry-based-learning of pupils working on a project. In doing so, students go through their own inquiry-based learning process while supporting and interviewing pupils. Students thus become aware not only of the pupilsí immediate needs, but also of their own professional competencies, the importance of thinking critically and realizing that the learning process is as important as the outcome. The inquiry-based-learning environment gives students the opportunity to explore and apply the knowledge they acquired in the module, as well as examine, evaluate and extend the comprehension of the contents. To analyze the effectiveness of such an innovative learning

environment different measuring instruments were used, like standardized interviews with pupils and their teachers, an online survey with students, and diary entries by pupils and students.

L 20

28 August 2015 15:45 - 17:15

Room Yellow_G3

Round Table

Technology integration

Technology integration

Keywords: Case studies,Educational technology,Competencies,E-learning/ Online learning,Knowledge creation,Action research,Pre-service teacher education,Social sciences,Higher education,Informal learning,Experimental studies,Quantitative methods,Instructional design,Comprehension of text and graphics,Multimedia learning

Sig's: SIG 27 - Online Measures of Learning Processes,SIG 4 - Higher Education,SIG 7 - Learning and Instruction with Computers

Chairperson: Noortje Janssen, University of Twente, Netherlands

MOOCs ñ A three dimensional analysis of its impact in higher education

Case studies,Educational technology,Competencies,E-learning/ Online learning,Knowledge creation

Vania Guerra, Zurich University of Applied Sciences (ZHAW), Switzerland; Maren Luebcke, ZHAW - Center for innovative teaching and learning, Switzerland;

Moocs have exposed to a general public the potential of social and emerging technologies for enhancing learning and democratizing higher education. On the one side, connectivism, as the underpinning pedagogy of MOOCs, intertwine pedagogy and technology in a way that it is not predictable the way how they influence each other. On the other side, open education propose different institutional models that can favor or constrain the effective use of resources, in terms of allowing different universities/teachers working together for either extend or enhance their offers. Due to the complexity of the topic, this paper present a three dimensional analysis of the impact of MOOCs in the transformation of higher education. Practical examples of three different approaches to MOOCs will be analyzed on the light of the three dimensions: a) transformation of teaching practices, b) urgency of technological flexibility and c) potential implications in the transformation of the educational system landscape. As conclusion, key impact factors related to the three dimensions will be presented and its interrelationship will be discussed. Finally, the use of the three-dimensional model will be presented as a systemic

analytical framework for further educational research in digital pedagogy, pointing out its potential integration to developmental research methods and activity theory analytical framework.

Fading boundaries between formal and informal learning

Action research,Pre-service teacher education,Social sciences,Higher education,Informal learning,Knowledge creation

Susanna Pontinen, University of Eastern Finland, Finland; Sini Kontkanen, University of Eastern Finland, Finland;

A knowledge building environment is one that enhances collaborative efforts to create and continually improve ideas. This argument is in line with recent debate which problematizes blurred line between formal and informal learning environments. Formal learning usually takes place in institutions (e.g. schools or universities) and informal learning out-of-school settings (e.g. at home, in hobbies). However, to make changes in current formal education is complexed. For example learning in technology-rich environments is not familiar to students. Students do not have much learning experiences in technology-rich environments and even if they were born in digital age, they do not see technology as an equal part of learning. Therefore, we started to design digital personal learning environment (PLE). Our action research starts with the question how we can improve current situation to promote students to utilise the ways of working they have learned outside the formal education. Also how they can benefit that knowledge in formal education in teacher education. Our study suggests that improvement of educational practices do not require the best practices or exact models. Instead, joint problem is a reason to collaborate and the encouraging atmosphere helps seeing technology as an equal part of students' learning. In the round table session we would like to share ideas about PLE by the perspective of student teachers learning. The main question is: what aspects are worth to investigate in detail in order to get important information about blurred line between formal and informal learning?

The presence of others: Exploring the effects of a social context on eye movements and Learning

Experimental studies,Quantitative methods,Instructional design,Comprehension of text and graphics,Multimedia learning

Manuel Oliva, Lund University, Sweden; Halszka Maria Jarodzka, Open University, Netherlands; Kenneth Holmqvist, Lund University, Sweden;

Decades of research on instructional design has led to guidelines on how to design learning material, such as to avoid split attention. This line of research makes statements about subtle cognitive and perceptual processes that ñ when taken into account ñ yield better learning outcomes. For instance, the split attention effect states that related information should be presented in an integrated way to avoid unnecessary search processes that use up cognitive resources. Most of the underlying research, however, was conducted under laboratory conditions, where one participant alone studies a learning task and conducts a test afterwards by him- or

herself. From social psychology research it is known, though, that the mere presence of other people can have a severe influence on how one succeeds in performing a task. Thus, we will investigate the effect of social presence on learning outcomes on a process level. Participants will receive three split design task on a technical topic, biology and math, and finally conduct a test on the learnt content. A new research setting allows us to perform eye tracking with up to 25 participants at the same time. Thus, participants will be randomly assigned to one of the four conditions: split attention learning material in an individual setting (SA-I), split attention learning material in a social setting (SA-S), integrated learning material in an individual setting (I-I), and integrated learning material in a social setting (I-S). Data are currently being collected and will be presented at the conference.

L 21

28 August 2015 15:45 - 17:15

Room Yellow_G2

Round Table

School effectiveness

School effectiveness, philosophy, culture and education

Keywords: Qualitative methods,Cultural diversity in school,Culture,Values education,Communities of practice,Learning in context,Experimental studies,Economics of education,School effectiveness,Primary education

Sig's: SIG 18 - Educational Effectiveness,SIG 21 - Learning and Teaching in Culturally Diverse Settings

Chairperson: Sirkku Kupiainen, University of Helsinki, Finland

Roma Pedagogical Assistants transform school and community

Qualitative methods,Cultural diversity in school,Culture,Values education,Communities of practice,Learning in context

Colette Daiute, The Graduate Center, CUNY, United States; Tinde Kovac Cerovic, University of Belgrade, Serbia; Tijana Jokic, Centre for Education Policy, Serbia; Aleksander Baucal, University of Belgrade, Serbia;

Roundtable will focus on Roma integration in education through introduction of Roma Pedagogical Assistants (RPAs) in multicultural schools as mediators between school and community. Research will be presented with 174 RPAs as key actors of this education reform in Serbia, providing insight into their perspectives on their roles as intercultural mediators and inviting discussion of major findings of the study, examples of ongoing qualitative analysis, and

policy implications. The roundtable will involve three authors of the study (Colette Daiute, Tinde Kovac-Cerovic, Tijana Jokic) and three invited discussants ñ an education researcher, a Roma scholar, and a methodology specialist. RPAs participated in a one-day storytelling workshop that was designed to elicit their perspectives within and about the RPA program, across a diverse range of relational expressions. Participants narrated personal journeys to becoming involved in the RPA program, narrated an experience of a Roma child in education, wrote letters of advice to future Roma PAs, made notes with messages to all teachers in the system, discussed a current event among Roma and non-Roma parents in a school, and, nine months after the above, reflected on results of analyses of those activities. This rich database yields nearly 1000 documents, with roughly 6000 units of analysis (sentences, turns) across all genres by all stakeholders. In the roundtable we will focus particularly on results of the analysis of a) obstacles, b) collaboration, c) assuming roles and responsibilities and d) the learning and teaching process as organizing principles of the narratives.

Grade retention research by means of marginal structural models

Experimental studies,Economics of education,School effectiveness,Primary education

Machteld Vandecandelaere, KU Leuven, Belgium; Bieke De Fraine, KU Leuven, Belgium; Jan Van Damme, KU Leuven, Belgium;

Grade retention has been a major issue in the field of educational effectiveness research. However, the field has not yet succeeded to find consistent, strong empirical evidence supporting or discouraging the practice. Given the cost and prevalence of the practice, it is an important societal and economic challenge to understand its causal effects on short and long-term outcomes. The current state of the art underlines the need for a comprehensive model and accurate methodology to assess the causal effects of grade retention over time to overcome limitations in previous research. This study addresses this need and contributes to the field of educational research by introducing the method of marginal structural models (MSMs) in the context of grade retention. MSMs are new to the field of educational research and offer several advantages compared to standard regression methods; MSMs allow valid adjustment for time-varying variables that confound the relationship between a (time-varying) treatment and the outcome. In other words, MSMs make it possible to make a fair comparison between children who are retained in different grades and promoted children. Using MSMs, this study investigates the effects of grade retention with regard to short and long term math achievement and wellbeing.

M 1

28 August 2015 17:15 - 18:45

Room Purple_H2

Paper Presentation

Attitudes and beliefs

Attitudes and beliefs

Keywords: Student learning,Attitudes and beliefs,Self-efficacy,Motivation and emotion,Quantitative methods,Reflective society,Citizenship education,Secondary education,Multicultural education,Teacher professional development,Social sciences,In-service teacher education,Pre-service teacher education,Reflection

Sig's: SIG 11 - Teaching and Teacher Education,SIG 13 - Moral and Democratic Education,SIG 8 - Motivation and Emotion

Chairperson: Tamara Marksteiner, University of Mannheim, Germany

Parentsí self-efficacy and performance goal and childrenís self-evaluation biases of competence

Student learning,Attitudes and beliefs,Self-efficacy,Motivation and emotion

Therese Bouffard, Universite du Quebec a Montreal, Canada; Carole Vezeau, College Regional of Lanaudiere at Joliette, Canada; Marie-Pier Langlois-Mayer, University of Quebec at Montreal, Canada; Audrey Marquis-Trudeau, University of Quebec at Montreal, Canada; Rebecca Levesque-Guillemette, University of Quebec at Montreal, Canada;

The aim of this study conducted among 406 elementary school children was two-fold: 1) to examine how parentsí self-efficacy and the importance they put on their childís school performance at year-1 were related to childrenís membership to trajectory groups characterized by different evolution of self-evaluation biases of scholastic competence over a five-year period; 2) to examine whether the childrenís academic performance in language arts and mathematics at the sixth year of the study differed according to their belonging to a given trajectory group. The SAS TRAJECTORY PROCEDURE permitted to identify five different trajectories. A multinomial logistic regression analysis performed to predict the group membership probability, considering the parental variables showed that both parentsí self-efficacy and the importance they put on their childís performance significantly increased the childís odds of belonging to a stable and high positive bias trajectory. At term, children from this trajectory outperformed all the others in language arts and mathematics, whereas those from a stable and high negative trajectory had the lowest scores. Although the adaptive nature of an optimistic evaluation of oneís competence is still under debate, results of this study suggest that it might be the case at least in the school domain.

Teaching civics for an equal / cohesive society:The impact of civic knowledge on studentsí attitudes

Quantitative methods,Reflective society,Attitudes and beliefs,Citizenship education,Secondary education,Multicultural education

Liana Konstantinidou, Zurich University of Applied Sciences, Switzerland; Fritz Oser, Universitat Freiburg, Switzerland;

In the context of the ICCS 2009 (International Civic and Citizenship Education Study), an IEA Study conducted in more than 35 countries all over the world, ways in which young people are prepared to undertake their roles as citizens were investigated. The study reports on studentsí achievement in a test of conceptual understandings and competencies in civic and citizenship education, but also in studentsí perceptions, behaviours, beliefs and attitudes relevant in the context of civic and citizenship. In this paper, the authors focus on knowledge and its effects on attitudes. Particularly, they investigate how civic knowledge explains studentsí attitudes toward equal rights and toward the influence of religion in society. The empirical results show the role of civic knowledge not only for being an active citizen within a country, but also for preparing young people to live in multicultural communities and suggest a reflection on and a rethinking of the content and goals of citizenship education.

Predicting the implementation intention of cooperative learning: The role of teachersí values

Quantitative methods,Teacher professional development,Attitudes and beliefs,Social sciences

Dimitra Filippou, University of Geneva, Switzerland; Celine Buchs, University of Geneva, Switzerland;

The purpose of this study is to investigate the predictive role of teachersí personal values (self-enhancement vs. self-transcendence) on their pedagogical attitudes regarding cooperation or competition and their intention in implementing cooperative learning. Based on Schwartzís values model, we argue that there is a consistency between values, attitudes and behavioural intentions sharing the same motivational goals. Hence, we hypothesize that teachers prioritizing self-transcendence values should value cooperation for their students and express more intentions to implement cooperative learning. Likewise, it is expected that self-enhancement values will be positively associated to competitive teaching attitudes and negatively associated to cooperative teaching attitudes and behavioural intentions. Two hundred and thirteen pre-service teachers completed a series of questionnaires. As predicted, results demonstrated positive correlations between values, attitudes and behavioural intentions with common motivational themes. More precisely, findings indicated that endorsing self-transcendence values is positively correlated to cooperative attitudes and implementation intention of cooperative learning. On the other hand, adherence of self-enhancement values is positively correlated to competitive pedagogical attitudes and negatively to cooperative attitudes and implementation intention of cooperative learning practices. Finally, mediation analyses showed that cooperative attitudes were mediators between self-transcendence values and intention to implement cooperative learning. These findings could ultimately lead us in exploring new paths for implementing cooperative learning.

The Functions of Beliefs: Teachersí Personal Epistemology on the Pinning Block

In-service teacher education,Pre-service teacher education,Teacher professional development,Attitudes and beliefs,Reflection

Helenrose Fives, Montclair State University, United States; Michelle Buehl, George Mason University, United States;

In this theoretical presentation, we seek to describe our working framework of belief functions using personal epistemology as an illustrative belief system. We approach personal epistemology as one of many sets of beliefs that influence and are influenced by teachersí experiences and contexts. In our working framework, we propose that beliefs function as as filters, frames, and guides in the cognitive system. Given the salience of personal epistemology to the central focus of teaching and learning, we examine teachersí personal epistemology as a particular set of beliefs within the belief system to illustrate belief functioning. To support our claims, we use findings from previous studies, when possible. We offer potential research designs for investigations to support our claims when previous research is unavailable. We conclude with implications for research and practice.

M 2

28 August 2015 17:15 - 18:45

Room Green_A1

Paper Presentation

Classroom discourse

Classroom discourse

Keywords: Quantitative methods,Teaching/instruction,Goal orientation,Social interaction,Interdisciplinary,Secondary education,Conversation/ Discourse analysis,Student learning,Argumentation,History,Educational technology,Citizenship education,Game-based learning,Reflective society,Cognitive skills,Intelligence,Peer interaction,Reasoning

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 11 - Teaching and Teacher Education,SIG 26 - Argumentation, Dialogue and Reasoning

Chairperson: Rocio Garcia-Carrion, University of Deusto, Spain

Gender differences in teachersí supportive behavior in class

Quantitative methods,Teaching/instruction,Goal orientation,Social interaction,Interdisciplinary,Secondary education

Sofie Lietaert, KU Leuven, Belgium; Bieke De Fraine, KU Leuven, Belgium;

The presence of numerous female teachers and few male teachers in schools initiated a discussion about the benefits of recruiting more male teachers in order to have a gender balanced teaching staff. However, the role of gender for teacher support has not been profoundly

investigated. Therefore, this study aims to examine biological (male versus female) and sociological gender differences (i.e., restricted emotionality or the ability to express emotions and pressure for gender conformity or the felt pressure to conform to oneís own sex) in different teacher support variables (i.e., autonomy support, structure, mastery approach, performance approach). Teachers (N = 1244) from 59 Flemish schools reported on their gender and teacher support. The results of the t-tests and Cohenís d calculations suggested that male teachers scored higher for mastery approach, performance approach and autonomy support and that female teachers scored higher for structure. Male teachers also reported to be more emotionally restricted and to experience more pressure to conform. Furthermore, multi group analyses revealed that restricted emotionality and pressure for gender conformity were negatively related to several teacher support variables, for both male and female teachers. This yields implications for recruitment and training of teaching staff.

Hidden gems in an I-R-E history classroom: Implications for research and practice

Conversation/ Discourse analysis,Student learning,Argumentation,History,Secondary education

Chava Shane-Sagiv, Mandel Leadership Institute, Israel;

Despite a century of attempted reform of history education, teacher recitation is still the dominant model of instruction. But the conclusion that there is little to learn from ìtraditionalî history teaching (e.g. Wineburg & Wilson, 1988) may be premature. The data in this paper were drawn from research into an ordinary history classroom over the course of one academic school year in a Jerusalem high school. The teacher relied closely on the state curriculum while encouraging student participation. Focusing on how student learning unfolded over time, the research explored how students sought to make sense of the history curriculum. In this paper I present an analysis of student contributions (such as spontaneous questions) and argue that: (a) contrary to prevailing assumptions, students in this classroom were engaged in learning about the past; but that (b) student reasoning and teacher response did not support a disciplined historical discourse but rather took the class away from the past to the present; and that (c) in order to engage both the heart and mind in the past in the context of the everyday history classroom teachers need to actively manage studentsí interests in past and present simultaneously.

Teaching Ethics and Moral Reasoning Using Commercial Videogames in School

Conversation/ Discourse analysis,Educational technology,Social interaction,Citizenship education,Secondary education,Game-based learning

Filipa De Sousa, University of Oslo, Norway; Ingvill Rasmussen, University of Oslo, Norway; Palmyre Pierroux, University of Oslo, Norway;

This paper reports on the ways in which a teacher appropriated a commercial videogame as a mediational tool to foster the development of high school studentsí moral reasoning. The study focuses on the teacher/s role and dialogical approach to conduct and orchestrate a game-based learning experience. The activity is analysed in relation to the concept of transformational play, usually associated with serious educational games. The high school class was observed and video

recorded during one month of lessons in citizenship and ethics. Students collaborated while playing the videogame, and discussed its narrative in relation to the curriculum content. The video data were analysed using methods from interaction analysis. The analysis shows that students linked new theoretical concepts in ethics to reflections on real world situations, personal experiences, and the game narrative, demonstrating moral reasoning on a deep level. We identified two aspects that, together, were important for teaching ethics and moral reasoning using commercial games. First, the participatory nature of the videogame promoted engagement at the whole class level. Second, the teacherís dialogical approach elicited and supported moral reasoning during debate moments. We conclude that, like serious educational games, the use of commercial videogames can promote transformational play in school settings when dialogically scaffolded by the teacher.

Can Far-Transfer Effects of Dialogic Instruction Be Explained by Proactive Control Strategies?

Reflective society,Argumentation,Cognitive skills,Intelligence,Peer interaction,Reasoning

Michael Nussbaum, University of Nevada, Las Vegas, United States; Christa Asterhan, Hebrew University of Jerusalem, Israel;

In this theoretical paper, we propose a new theory for why certain educational programs that immerse students in dialogue and argumentation result in far-transfer effects between subjects (e.g., science to English) and to tests of cognitive abilities and fluid intelligence. The theory is that in these programs, students discover and practice ìproactive executive control strategies.î These strategies involve intentionally activating or inhibiting a certain cognitive process, such as protection from interference. The acquisition and strengthening of these strategies has been used to explain far-transfer effects from working memory training to test of fluid intelligence, based on a cognitive architecture proposed by Taatgen (2013). We propose that similar processes may be at work in dialogic instruction. For example, when one is considering someone elseís counterargument, one has to protect the mind from interference by oneís own argument, and then switch attention back to oneís argument to advocate or evaluate it. Our account is consistent with those explaining far-transfer effects from the generation of intermediate task general rules (Koedinger & Stampfer, in press) as well as the acquisition of conceptual agency through participation in conversations that matter (Greeno, in press). Our theory also has the advantage, however, of uniting various levels of cognitive analysis, from the micro to the more molar.

M 3

28 August 2015 17:15 - 18:45

Room Green_A2

Paper Presentation

Collaborative and cooperative learning

Collaborative and cooperative learning

Keywords: Case studies,Video analysis,Social aspects of learning,Higher education,Cooperative/collaborative learning,Quantitative methods,Culture,Social interaction,Social sciences,Communities of learners,Educational technology,Student learning,Self-regulation,Computer-supported collaborative learning

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 20 - Computer Supported Inquiry Learning,SIG 4 - Higher Education

Chairperson: Alfredo Bautista Arellano, Nanyang Technological University , Singapore

What initiates well-performing groupís regulation activities in collaborative learning situations?

Case studies,Video analysis,Social aspects of learning,Higher education,Cooperative/collaborative learning

Piia Naykki, University of Oulu, Finland; Sanna Jarvela, University of Oulu, Finland;

Collaborative learning is widely used instructional method in higher education context, but it is not self-evidently successful in terms of achieving high-level learning outcomes and positive learning experiences. In order to enhance deep-level understanding, such learning invites active self- and socially shared -regulation of learning from the group members (Hadwin, Jarvela, & Miller, 2011). This study implements a process-oriented approach to explore what kinds of monitoring activities differently performing groups use to regulate their learning and particularly, what kind of interaction initiates group membersí metacognitive monitoring in collaborative learning situations. Five groups of teacher-education students (N = 22) were observed throughout a three-month course. Video recordings (33 hours) of face-to-face group interaction (N = 12,931 speech turns) and pre- and post-tests of studentsí knowledge were collected. The well-performing group monitored content understanding more often and from the very beginning of the group work, while their weak-performing counterparts focused on monitoring task-level activities. Furthermore, the results indicate that the well-performing group was active at both the individual and group level through using several different kinds of interaction types to initiate monitoring episodes. This kind of in-depth analysis has well needed implications for designing learning activities to promote high-level collaborative learning.

Honours culture: Do honours students create a different study culture?

Quantitative methods,Culture,Social interaction,Social sciences,Higher education,Cooperative/collaborative learning

Lammert Tiesinga, Hanzehogeschool Groningen, Netherlands; Elanor Kamans, Hanze University of Applied Sciences, Netherlands; Judith Volker, Hanze University of Applied Sciences, Netherlands; Marca V.C. Wolfensberger, Hanzehogeschool Groningen, Netherlands;

The aim of the current study is to understand what typifies a culture of honours within programs directed towards excellence in higher education. Based on literature and qualitative research we argue that honours students are directed towards 1) personal development, 2) collaboration, 3) innovation and creativity, and 4) excellence and that honours culture can be characterized in these terms. In the current study we tested whether 1) honours students are more directed towards these four elements than regular students and 2) whether these four elements are related to participation or non-participation in honours programs. To test this a digital questionnaire (N = 1246) measuring the four elements of honours culture and reasons for participation or non-participation in honours programs was developed and distributed. Independent t-tests show that honours students indeed differ from regular students on personal development, innovation and excellence. Further, although honours students do not differ from regular students on collaboration within the regular program, honours students participating in collaborative honours program do indeed experience more collaboration and sense of community within their honours programs than within regular classes and groups. With respect to reasons to participate, correlational analysis further underlines the importance of collaboration; collaboration within the honours community is related to wishing to work together with a group of motivated students, liking to work on creative and innovative tasks and interest in the content of the program. Our data replicates results from earlier studies and underlines the importance of collaboration and community in understanding honours culture.

Explaining How Honors Students Position Themselves When Collaborating With Regular Students

Quantitative methods,Social interaction,Higher education,Communities of learners

Elanor Kamans, Hanze University of Applied Sciences, Netherlands; Lammert Tiesinga, Hanzehogeschool Groningen, Netherlands; Judith Volker, Hanze University of Applied Sciences, Netherlands; Marca V.C. Wolfensberger, Hanzehogeschool Groningen, Netherlands;

In this line of research we take a social psychological approach to understanding how honors students position themselves when collaborating with regular students. More specifically, we explore whether stereotypes about honors students as well as inclusion goals affect the extent to which honors students adapt to group norms in terms of ambition, motivation and excellence or take a more leading role when working with regular students. Results of a small more qualitative pilot study (N = 14) show that honors students indeed tend to behave differently by either adapting to the group of regular students or by taking the lead/control. Further the main reasons provided for this are preventing disharmony and delivering high quality work. Results of a larger survey study show that honors students (N = 106) are more likely to take a leading role when they feel valued by the group in terms of competence and inclusion. Further, regular studentsí (N = 729) attitude to such a role is particularly negative when they do not want to include honors students and sense that honors students do not want to be included. Results are discussed in terms of its effects on creating a culture of excellence via honors programs within higher education and provide insights in how to improve the interaction between honors and regular students.

Comparing the effectiveness of CSCL supports for shared task perceptions in shared regulation

Educational technology,Student learning,Self-regulation,Higher education,Computer-supported collaborative learning

Mariel Miller, University of Victoria, Canada; Allyson Hadwin, University of Victoria, Canada;

This study examined the effect of four levels of CSCL planning support on groupsí shared task perceptions for socially shared regulation. Participants were 192 consenting undergraduate students working in a complex online collaborative assignment. Groups were assigned to one of two solo planning conditions (high vs. low support) and one of two group planning conditions (high vs. low support). A 2 x 2 factorial between-subjects design was used to examine whether level of support in solo and shared planning tools affected accuracy of groupsí shared task perceptions, degree to which groups capitalized on group membersí accurate solo task perceptions in their shared task perceptions, quality of group planning discussion, and performance on the collaborative task. Results indicated high level of support in group planning tools supported groups in capitalizing on one anotherís personal task interpretations to develop shared task perceptions that were accurate for the task.

M 4

28 August 2015 17:15 - 18:45

Room Green_A4

Paper Presentation

Conceptual change

Conceptual change and culture and education

Keywords: Case studies,Cultural diversity in school,Culture,Science education,Secondary education,Multicultural education,Experimental studies,Student learning,Conceptual change,Misconceptions,Primary education,Mixed-method research,Learning approaches,Social sciences,Higher education,Quantitative methods,Comprehension of text and graphics

Sig's: SIG 21 - Learning and Teaching in Culturally Diverse Settings,SIG 3 - Conceptual Change

Chairperson: Rosa Hettmannsperger, Institut Universitaire de Formation des Enseignants (IUFE), Switzerland

Representations: Cultural implications about use

Case studies,Cultural diversity in school,Culture,Science education,Secondary education,Multicultural education

Bruce Waldrip, University of Tasmania, Australia;

This paper explores how teachers utilise representations in their teaching. It illustrates this use through examples drawn largely from Australia, Indonesia and Melanesia. It describes the value that these teachers perceived in utilising these and how their use impacted on teaching and learning strategies. It explains representational attempts by teachers to enable student learning as they work with students to negotiate effectively between everyday discourse, culture, and values and those of the science community and to sustain connections between students community beliefs and canonical science in these settings. It concludes through a discussion on how these representations are constrained by the assessment process and how they can be utilised to explore the development of understanding in each of these regions.

Using Analogy to Help Children Understand Counter-Intuitive Expository Text

Experimental studies,Student learning,Conceptual change,Misconceptions,Science education,Primary education

Irini Skopeliti, University of Patras, Greece; Stella Vosniadou, National and Kapodistrian University of Athens, Greece;

The present study investigated the influence of an instructional analogy in the comprehension of counter-intuitive scientific explanation in expository text. Totally 149 children, 3rd graders and 5th graders, were randomly assigned to an experimental or a control group. The experimental group read and recalled a text, presenting the scientific explanation of the day/night cycle with the use of analogy. The control group read and recalled the same text without the analogy. All participants gave pretest and posttest explanations of the phenomenon in question. We predicted better recall and fewer invalid inferences in the analogy condition compared to the no-analogy. The results showed that most of the explanations at pretest were incongruous with the scientific explanation and interfered with the comprehension of texts causing invalid inferences. As predicted, the children in the analogy condition showed better recall and created fewer invalid inferences compared to the children in the no-analogy condition. An examination of pretest and posttest explanations indicated that the reading of the analogy text created greater changes in participantís prior knowledge compared to the no-analogy text. However, no text resulted in radical changes equal to restructuring of initial explanations. The results confirmed our hypotheses, supporting the claim that analogies can facilitate the understanding of counter-intuitive information.

Psychology studentsí perceptions of the correspondence between approaches to learning and outcomes

Mixed-method research,Student learning,Learning approaches,Social sciences,Higher education

Maria Ohrstedt, Stockholm University, Sweden; Petra Lindfors, Stockholm University, Sweden; Max Scheja, Stockholm University, Sweden;

Psychology studentsí perceptions of the correspondence between approaches to learning and academic outcome were mapped and compared with actual influence. Both quantitative and qualitative data were analysed. Preliminary results suggest a successive homogenization of student activities related to coursework. The perception of applying more ìefficientî ways of dealing with coursework, corresponding better to examination demands, was identified as an important driver. Although the development towards perceived efficacy could be described as students successively adopting higher levels of surface approaches to learning, students in general judged such approaches as resulting in poorer examination grades, compared to deep approaches. However, surface approaches to learning were negatively correlated to examination grades, but to a lesser extent than students thought, while deep approaches turned out to be less influential. Strategic approaches to learning stood out as having the most positive impact on course grades, both as judged by the students and in actual fact.

Who benefits from visual illustrations in psychology teaching: A question of learning style or not?

Quantitative methods,Student learning,Comprehension of text and graphics,Social sciences,Secondary education

Ann-Sofie Jagerskog, Stockholm University, Sweden; Fredrik Jonsson, Stockholm University, Sweden;

A key question concerning the use of visual illustrations in teaching is whether teaching should be adapted according to studentsí preferred learning style (visualiser-verbaliser), whether focus should be on strategies that work well in general (multimedia learning), independent of preference, or whether it is worthwhile to combine the two to further improve learning. Upper secondary school students were given a lecture presented only verbally or with the aid of a visual illustration. Results from a learning test were analysed in relation to the studentsí self rated learning style. Visouverbal presentation resulted in better learning than verbal presentation only, independently of learning style. Support was not found for the learning styles hypothesis, since there was no crossover interaction. However, students with mixed or visual learning styles performed generally better on the learning test than students with a verbal learning style. Since the use of visual illustrations seems to have a beneficial effect on learning for all students, this mode of instruction ought to be used in teaching. Rather than being a tool for teachers to adapt their teaching, learning styles diagnoses may be used in order to identify students who need to develop their study strategies towards a more visual preference.

M 5

28 August 2015 17:15 - 18:45

Room Green_A3

Paper Presentation

Early childhood education

Early childhood education

Keywords: Quantitative methods,Assessment methods and tools,Social sciences,Early childhood education,Mixed-method research,Qualitative methods,Reflective society,Attitudes and beliefs,Literacy,Student learning,At-risk students,Interdisciplinary,Primary education,Cognitive development,Competencies,Reasoning,Science education,Inquiry learning

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 5 - Learning and Development in Early Childhood

Chairperson: Catherine Gunzenhauser, Leipzig University, Germany

Early-Q project: Examining the quality of 'Space and furnishings' of Greek ECE environments

Quantitative methods,Assessment methods and tools,Social sciences,Early childhood education

Evridiki Zachopoulou, Alexander Technological Educational Institute of Thessaloniki, Greece; Vasilis Grammatikopoulos, University of Crete, Greece; Athanasios Gregoriadis, Aristotle University of Thessaloniki, Greece;

Theorists, practitioners and researchers agree that in order to provide qualitative education to young children, one of the basic needs of all children must be met; that need is the protection of their health and their safety. A high quality early childhood education program must contain a safe and stimulating environment for the child. This paper presents specific results from the Early-Q THALES project regarding one dimension of the process quality of the Greek early childhood education environments, the 'Space and Furnishings'. The Early-Q THALES project is a co-funded project by the European Union and national resources for the evaluation of the quality of Early Childhood Education (ECE) in Greece. A representative sample of 535 preschool classrooms was assessed from various areas of the country. 20 trained assessors evaluated the participating classrooms. The results showed that the preschool classrooms that were evaluated with the ECERS-R were characterized by relatively high quality regarding the 'Space and Furnishings' subscale. The participating classrooms obtained mean quality scores (M: 4.40) within the 'adequate range'. The higher scores were obtained in the 'furniture for routine care, play and learning' and the 'room arrangement for play' items, while the lowest ones were obtained for the 'space for privacy' and the 'furnishings for relaxation and comfort' items. The findings from this paper highlight on the sociocultural and the educational differences that characterize the Greek early childhood education system. *This project is implemented through the framework of the Operational Programme ´Education and Lifelong Learningª and co-financed from the European Union (European Social Fund) and from national sources.

Connecting two worlds-Discrepancy between media experiences of children and attitudes of teachers

Mixed-method research,Qualitative methods,Reflective society,Attitudes and beliefs,Literacy,Early childhood education

Marion Weise, University of Apllied Science Esslingen, Germany;

Media literacy must be viewed as key competence and a necessary requirement for equal opportunities in the education system (Marci-Boehncke/Rath 2013). Information and the competence to access, analyze, evaluate, create and participate with different types of symbols empower people to participate in modern society (van Dijk/Hacker 2003). Therefore we need educators and teachers, who perceive themselves as media-literate and who have insights into the media lives and the construction of media culture of children in early childhood. A factor that determines the media literacy education in institutional settings is attitudes and beliefs towards media. The findings of this study, that uses a multi-method and multi-cultural design with a focus on qualitative interviews, indicate that the media experiences children make in their everyday life in informal settings are not meet by their teachers. The majority of teachers express negative positions towards media and state that media education should provide alternatives to media usage. So we need to start at universities, with the young teachers in training to bridge the discrepancy between those two worlds and to accompany children on their way to become media-literate, reflective and engaged participants, who are the foundation of a democratic society.

Teacher-Child Relationships and Child Problem Behaviors

Quantitative methods,Student learning,At-risk students,Interdisciplinary,Primary education

Eija Pakarinen, University of Jyvaskyla, Finland; Gintautas Silinskas, University of Jyvaskyla, Finland; Riitta-Leena Metsapelto, University of Jyvaskyla, Finland; Marja-Kristiina Lerkkanen, University of Jyvaskyla, Finland; Anna-Maija Poikkeus, University of Jyvaskyla, Finland; Jari-Erik Nurmi, University of Jyvaskyla, Finland;

Previous research highlights the benefits of warm and supportive teacherñchild relationships for child outcomes. Evidence shows that children exhibiting externalizing and internalizing problems are at greater risk for having problematic relationships with their teachers than other children. Given that there is an evident need to better understand the dynamics between teacherñchild relationships and child characteristics this study investigated the cross-lagged associations between teacherñchild relationships and childrenís problem behaviors in a sample of 440 Finnish teacherñchild dyads. Teachers evaluated childrenís internalizing and externalizing problems at the end of Grades 4 and 6, and also reported closeness and conflict in their relationship with a particular child. The results showed that the higher the children scored on externalizing problem behaviors at Grade 4, the more conflict their teachers reported in relationships with them two years later. Childrenís internalizing problems were positively associated with concurrent conflict at Grade 4 and negatively related with concurrent closeness at both grades. Boys had less close and more conflictual relations with their teachers than girls. Teachers also reported more conflict with children from low educated families. Implications for educational practice and future research are discussed.

Scientific Reasoning in Kindergarten: Cognitive Factors in Experimentation and Evidence Evaluation

Quantitative methods,Cognitive development,Competencies,Reasoning,Science education,Inquiry learning

Joep van der Graaf, Radboud University Nijmegen, Netherlands; Eliane Segers, Behavioural Science Institute, Netherlands; Ludo Verhoeven, Radboud Universiteit Nijmegen, Netherlands;

The aim of present study was to investigate individual differences in scientific reasoning by relating executive functions to scientific reasoning (experimentation and evidence evaluation). In addition, these effects were investigated in a spatial mediation model and a verbal mediation model. We assessed the executive functions, verbal, and spatial measures in 100 four-year-olds. In the spatial mediation models, the effects of visuospatial working memory and spatial visualization were not significant and the models did not hold. The verbal mediation models did hold. Verbal working memory positively related to evidence evaluation, while inhibition positively related to experimentation and evidence evaluation. For both experimentation and evidence evaluation, grammar was a significant mediator of these effects, while vocabulary was not. The results suggest that executive functions are a basis on which kindergartners acquire other skills, such as scientific reasoning and grammar. It appeared that experimenting does not recruit working memory. This might be due to the spatial presentation and the hands-on designing, which might offload working memory. It appeared that evidence was evaluated using verbal and not visuospatial working memory. This suggests that verbalization aids mental representation and comparison of the evidence. The role of grammar in scientific reasoning might be explained by a common underlying mechanism of grammar with other cognitions. It can be concluded that executive functions relate to scientific reasoning, and that this effect was mediated by grammar.

M 6

28 August 2015 17:15 - 18:45

Room Brown_B8

Paper Presentation

Emotion and affect

Emotion and affect/Culture and education

Keywords: Quantitative methods,Educational policy,Emotion and affect,Social interaction,Workplace learning,Motivation and emotion,Student learning,Emotion and cognition,Mathematics,Primary education,Instructional design,Teaching/instruction,Culture,Interdisciplinary,Problem-based learning,Secondary education

Sig's: SIG 6 - Instructional Design,SIG 8 - Motivation and Emotion

Chairperson: Asha Jitendra, University of Minnesota, United States

On the role between social support, job demands, stress and burnout in Australian school principals

Quantitative methods,Educational policy,Emotion and affect,Social interaction,Workplace learning,Motivation and emotion

Simon Beausaert, Universite catholique de Louvain (UCL), Belgium; Christelle Devos, Universite catholique de Louvain (UCL), Belgium; Philip Riley, Australian Catholic University, Australia;

More than ever before principals are dealing with stress and burnout. Following the Demand-support-constraints model (Payne, 1979), reasons for stress and burnout can be found in the high job demands and the lack of social support in the environment. This longitudinal study, with 12 months in between two measurements, researched the effect of emotional and quantitative demands and social support from colleagues on (general, somatic and cognitive) stress and in turn burnout in Australian principals (N = 1335). It was found that the higher the demands, the more stress and in turn the more burnout. In contrast, the more social support from colleagues, the less stress and the less burnout principals showed. The findings highlight the importance of setting up and maintaining communities of principals where they can find the necessary professional support.

Emotion regulation strategies used by fifth and sixth graders in mathematics

Quantitative methods,Student learning,Emotion and cognition,Mathematics,Primary education

Vanessa Hanin, Universite catholique de Louvain (UCL), Belgium; Catherine Van Nieuwenhoven, UCL, Belgium;

Although emotions constitute a more recent object of research, they are known, like cognitive and motivational dimensions, as a major component of learning and academic performance (Ahmed, Minnaert, van der Werf & Kuyper, 2013 ; Hanin & Van Nieuwenhoven, 2014 ; Opít Eynde, De Corte & Verschaffel, 2007). Inasmuch emotions are regarded as a major component of the learning process in the same way as cognitive and motivational dimensions, it becomes necessary to be able to regulate them. In this respect, we investigated the strategies mostly used by fifth and sixth graders to regulate negative emotions when resolving mathematical problems. Among the various classifications of emotion regulation strategies proposed in the literature, we retained the one of Mikolajczak, Quoidbach, Kotsou & Nelis (2009). Given the lack of instrument grasping their set of strategies, we designed a questionnaire based on several existing tools. It examines 19 strategies through 57 items. 757 students of grade 5 and 6 coming from 15 Belgian schools took part in this study. The internal validity of the questionnaire has been confirmed by factorial structure analysis and Cronbachís alphas. First of all, principal component analysis highlighted 8 groups of regulation strategies: 4 viewed as adaptive and 4 viewed as maladaptive. It also seems that adaptive strategies are less used by boys than by girls. Moreover, our findings showed that older students resort significantly more to maladaptive strategies than younger ones when resolving mathematical problems. Finally, whatever the school level, students appeal more to adaptive strategies than to maladaptive ones.

Instructional methods and language of instruction in intercultural learning: An intervention study

Instructional design,Teaching/instruction,Culture,Interdisciplinary,Problem-based learning

Vera Busse, Carl von Ossietzky Universitat Oldenburg, Germany; Ulrike-Marie Krause, University of Oldenburg, Germany;

The paper presents the results of a 2x2-factorial quasi-experimental intervention study with a pre- and post-test. We implemented an intercultural learning unit and varied the teaching approach (problem-based with an affective-creative focus/problem-based with a cognitive-analytical focus) and the language of instruction (German/English). The learning unit covered six 45-minute segments and was conducted in nine school classes (n = 143) at the upper secondary level during regular lessons. Five additional school classes (n = 66) served as a control group which did not take part in the learning unit. Based on authentic problems in the form of critical incidents, misunderstandings and conflicts were presented that arose as a result of cultural differences. Through the individual and cooperative analysis of the critical incidents, the students were prompted to adopt othersí perspectives and to reflect on their own cognitive and affective processes (such as categorisation, judgment and empathy). In the course of the learning unit, the students also developed strategies for dealing with the situations. In addition, students engaged in a simulation game (affective-creative approach) or analysed film material (cognitive-analytical approach). The cognitive, motivational and attitudinal effects of the intervention were examined with the help of tests, surveys, and audio recordings. Students in the experimental groups significantly outperformed the control groups. In addition, learning success was considerably higher than in a previous study (Busse & Krause, in press). Both teaching methods were equally effective, and using a foreign language (English) for instruction did not impair knowledge acquisition.

The appraisal of gain and loss-framed value messages prior to a high-stakes mathematics examination

Quantitative methods,Teaching/instruction,Emotion and affect,Mathematics,Secondary education,Motivation and emotion

Dave Putwain, Edge Hill University, United Kingdom; Wendy Symes, Ludwig-Maximilians Universitat (LMU), Germany;

We report on a study that examined how messages communicated by a teacher that draw attention to the value of mathematics, or attainment in mathematics, prior to a high-stakes mathematics examination were appraised challenging, threatening or were disregarded. Participants (n = 539) in their final year of compulsory secondary education, who were studying for a high-stakes mathematics examination, self-reported academic self-efficacy and intrinsic, attainment and utility value of mathematics and were asked how they would appraise either a gain or less-focused message about the importance of mathematics, or attainment in mathematics. Results showed that messages would be disregarded if mathematics was not valued. If mathematics was valued, a challenge appraisal followed when the student had high

academic self-efficacy. A threat appraisal followed when mathematics was valued but the student had low academic self-efficacy. Message frame did not influence the appraisal of messages. Teachers and instructors would be advised to consider how student characteristics, such as academic self-efficacy and value, might influence appraisal before using such messages.

M 7

28 August 2015 17:15 - 18:45

Room Brown_B1

Paper Presentation

Emotion and affect

Emotion and affect

Keywords: Content analysis,Qualitative methods,Pre-service teacher education,Emotion and affect,Higher education,Experimental studies,Emotion and cognition,Peer interaction,E-learning/ Online learning,Computer-supported collaborative learning,Quantitative methods,Teacher professional development,Professions and applied sciences,Workplace learning,Motivation and emotion,Student learning,Science education,Primary education

Sig's: SIG 11 - Teaching and Teacher Education,SIG 18 - Educational Effectiveness,SIG 7 - Learning and Instruction with Computers,SIG 8 - Motivation and Emotion

Chairperson: Alfred Weinberger, Padagogische Hochschule der Diozese Linz, Austria

From anxiety to enthusiasm - Patterns of emotions among student teachers

Content analysis,Qualitative methods,Pre-service teacher education,Emotion and affect,Higher education

Henrika Anttila, University of Helsinki, Finland; Kirsi Pyhalto, University of Oulu; University of Helsinki , Finland; Tiina Soini-Ikonen, University of Tampere, Finland; Janne Pietarinen, University of Eastern Finland, Finland;

There is evidence that studying to become a teacher is an emotional experience that can promote both positive and negative emotions (Authors, 2014; Timotstsuk & Ugaste, 2012). However we know surprisingly little about how and why emotions change and what kind of patterns of emotions student teachers experience during their study path. Altogether 19 Finnish primary school student teachers were interviewed. The data were qualitatively content analysed. Preliminary results showed, that student teachers emotions change widely during emotional episodes they experience during their study path. Changes in emotions were identified in both long and short episodes. Changes in emotions were triggered for example by constructive feedback and friction between teachers or other students. Student teachers experienced a wide

variety of different kind of emotional patterns during their studies. In some of the emotional patterns the emotions valence as well as the arousal changed during the episode, and thus our results showed that student teachers emotional patterns can change during one emotional episode from enthusiasm to frustration and then to disappointment. At the same time, many of the patterns were permanently positively or negative through the whole episode. Moreover, the results showed that student teachers experience different kind of emotional patterns on the individual level. Preliminary results also suggest that the triggers of emotional change are commonly social by their nature. Furthermore, our results provide tools to identify emotional patterns and triggers behind the emotional change, and thereby enable further development of emotionally optimal learning environments.

Sharing emotions during a computer-mediated collaborative task: An eye-tracking study

Experimental studies,Emotion and cognition,Peer interaction,E-learning/ Online learning,Computer-supported collaborative learning

Donato Cereghetti, University of Geneva, Switzerland; Gaelle Molinari, Distance Learning University Switzerland, Switzerland; Guillaume Chanel, University of Geneva, Switzerland; Thierry Pun, University of Geneva, Switzerland; Mireille Betrancourt, University of Geneva, Switzerland;

With the development of distance learning programs, it is now usual for learners to complete collaborative tasks remotely. Even if audio and video channels are available, the subtle cues that allow to infer the partnerís emotional states (e.g., interest, boredom, frustration) are seriously diminished. This study explores the impact of using a group emotion awareness tool on learnersí interaction and perception. To achieve this goal, a dual eye-tracking approach was used in combination with an analysis of the number of positive and negative emotions shared during interaction. Results showed that participants mainly looked at and communicated positive emotions during collaboration. Interestingly, participantsí attention was equally divided between their own- and their collaboration partnerís emotional information. Finally, men spent more time looking at their partnerís emotions compared to women. Results are discussed in terms of mutual modeling of partnerís emotions during a remote collaborative task.

What makes for a bad day of beginning teachers? A diary study on daily hassles and daily uplifts

Quantitative methods,Teacher professional development,Emotion and affect,Professions and applied sciences,Workplace learning,Motivation and emotion

Juliane Schmidt, Leibniz Institute for Science and Mathematics Education (IPN), Germany; Uta Klusmann, Leibniz Institute for Science and Mathematics Education, Germany;

Beginning teachers are likely to experience stress after the transition from university to school, resulting in high rates of job turnover within the first five years in many countries (OECD, 2005). While prior research focused on stressors as stable factors, like studentsí misbehavior (Chaplain, 2008), the aim of the current study was to examine daily uplifts and hassles of

beginning teachers in terms of their content and frequency, their stability, and their effect on daily emotional exhaustion. The data base consisted of 141 beginning teachers answering an online diary for 14 consecutive days. Results showed that most daily uplifts and hassles of teachers were related to events that happened while teaching in class, the interaction with colleagues, and organization. Furthermore, daily uplifts and hassles showed substantial variation on the day-to-day level. Additionally, daily uplifts and daily hassles could explain intraindividual variation in beginning teachersí emotional exhaustion. The findings indicate that daily uplifts and hassles should be considered in studies on teacher well-being.

Anxiety, efficiency & fluency

Quantitative methods,Student learning,Emotion and affect,Science education,Primary education,Motivation and emotion

Jeremy Pouille, Universite Grenoble Alpes, France; Pascal Bressoux, Universite Pierre-Mendes-France, France;

In the French school context, an anxious culture of results has emerged regarding academic success (Baudelot, & Establet, 2009). This is why it seems relevant to question the effects of anxiety on academic tasks, especially on a fundamental one: reading. Our research is organized around two main objectives. First, we describe the validation of a tool to evaluate collectively the reading fluency level of 5th graders. Second, we evaluate for the same students the effect of school anxiety on reading fluency performances, questioning the possible mediating role of self-efficacy beliefs in this relation. Data are gathered for 527 French students at the beginning and the end of the school year with self-report questionnaires. To take into account the hierarchy of our data, we use multilevel models to suggest a mediation model linking school anxiety and performances in reading fluency through self-efficacy beliefs.

M 8

28 August 2015 17:15 - 18:45

Room Brown_B2

Paper Presentation

Higher education

Higher education

Keywords: Quantitative methods,Student learning,Emotion and cognition,Social sciences,Higher education,Motivation and emotion,Qualitative methods,Teacher professional development,Developmental processes,Workplace learning,Cooperative/collaborative learning,Reflection,Professions and applied sciences,Vocational education,Inquiry learning,Cognitive skills,Metacognition,Lifelong learning

Sig's: SIG 14 - Learning and Professional Development,SIG 4 - Higher Education

Chairperson: Alaric Kohler, HEP-BEJUNE, University of teacher education, Switzerland

The self-fulfilling prophecy of fear of academic failure

Quantitative methods,Student learning,Emotion and cognition,Social sciences,Higher education,Motivation and emotion

Taiga Brahm, University of St. Gallen, Switzerland; Tobias Jenert, University of St. Gallen, Switzerland; Dietrich Wagner, University of St. Gallen, Switzerland;

Academic success in Higher Education is influenced by a number of different factors. This paper tackles the question if the individual levels of motivation, anxiety, enjoyment and self-efficacy, measured immediately before entering university, influence the probability of academic success. Former studies have shown an influence of the high school grade, the learning environment and motivational variables. They do not investigate, however, the individual levels of the mentioned constructs before the beginning of the studies. This research was conducted at the University of St. Gallen/ Switzerland. The sample includes 695 first-year students who provided information about the individual level of the mentioned constructs. Descriptive statistics show that on average the students are highly motivated, have a high level of self-efficacy and are looking forward to their studies before their beginning. Yet, there are students who have a high level of fear of failure in the study in spite of their high motivation and self-efficacy. A logistic regression shows that there is a significant effect of fear of failure on the probability of study success. This paper shows that fear of failure can increase the probability of academic failure and thus become a self-fulfilling prophecy. It confirms fear as an important factor for academic success. Furthermore, other important factors for academic success, for example the high school grade, could be confirmed in this study.

Three dimensions of teachers' collaborative expertise in a masters' degree programme

Qualitative methods,Teacher professional development,Developmental processes,Higher education,Workplace learning,Cooperative/collaborative learning

Niina Impio, University of Oulu, Finland; Pirkko Hyvonen, University of Oulu, Finland; Sanna Jarvela, University of Oulu, Finland;

Teachersí collaborative expertise is an important part of teachersí professional development. Despite of growing amount of research about teachersí learning in collaborative settings, studies about teachersí collaborative expertise is lacking. This longitudinal study explores the development of teachersí collaborative expertise during and after two-year masterís degree programme. Teachers (N=27) from different fields participated in the study beside their work and studying in masterís programme. The data consist of 73 interviews and 134 analytical self-reflections, which were collected during years 2009-2014. A qualitative data-driven content analysis was aimed to investigate how teachers describe their collaborative expertise, and how they improve their collaborative skills during the masterís studies and in their work. The results

show that teachersí collaborative expertise consists of three dimensions: personal knowledge and skills, collaborative teaching practices, and collaborative agency. The results indicate that knowledge of collaborative learning, both in practical and theoretical level, is a vital prerequisite for development of collaborative expertise. The results contribute for teacher education and teachersí professional development by providing new insight for supporting teachersí collaborative expertise.

Ways of Seeing: Critical Reflection in the Education of Professionals

Student learning,Reflection,Professions and applied sciences,Higher education,Vocational education,Inquiry learning

Jan Huyton, Cardiff Metropolitan University, United Kingdom;

This paper explores how reflective practice for the education of professionals has moved away from the critical reflection envisaged by its early advocates. Critical reflection for emancipation, experimentation and transformation, as envisaged by Dewey, was taken forward by theorists such as Schon, Mezirow, and Carr & Kemmis as models of critical reflective practice. It is argued that the policy context of demanded professionalism has resulted in benign forms of reflective practice which serve to reproduce, rather than challenge, the status quo. This has shifted reflective practice from its theoretical underpinnings of critical reflection, into a means of affirming adherence to national policy and occupational standards. Using a theoretical framework influenced by Habermasís ëlifeworldí and ësystemí the paper explores the appropriateness of reflective practice for the education of twenty-first century professionals. The paper culminates in a suggestion that we look beyond familiar academic and professional domains to the work of artist, writer and political commentator John Berger. Bergerís work offers an inspirational starting point for new ways of unfettered critical reflection in the learning, teaching and assessment of professionals.

Prior Education of Open University Students Contributes to their Capability of Critical Thinking

Quantitative methods,Student learning,Cognitive skills,Metacognition,Higher education,Lifelong learning

Saara Repo, University of Helsinki, Finland; Erja Rusanen, University of Helsinki, Finland; Taina Lehtinen, University of Helsinki, Finland; Heidi Hyytinen, University of Helsinki, Finland;

Open Universities in Finland offer opportunity for studying in university regardless of educational background. Therefore there are substantial differences in studentsí previous education, age, life situation and motivation. It is assumed that studentsí critical thinking skills also vary. The aim is to study Open University studentsí level of critical thinking measured by constructed-response test and self-evaluation questionnaire. Furthermore, we ask if previous education or discipline explain their skills and if it has effect on how accurately students evaluate their critical thinking skills. The participants (N=138) were beginning their studies in education

sciences at Open University of Helsinki in fall 2012. The dependent variables were constructed-response and self-evaluation test of critical thinking. The independent variables were gender, age, previous educational level and discipline. The results confirm that the studentsí previous education had a clear connection to critical thinking skills. Higher education prepares best students to think critically, measured by construct-response or self-evaluation test. Furthermore, it seems, that general upper-secondary education gives better abilities to critical thinking than vocational education. Only in the group of students with previous higher education there was a significant correlation between constructed-response and self-evaluation test. This can be interpreted as a sign of better metacognitive skills. Higher education is not only preparing students to think critically, but it also develops studentsí metacognitive skills, so that they can evaluate their critical thinking skills more accurately than students with lower-level education.

M 9

28 August 2015 17:15 - 18:45

Room Brown_B4

Paper Presentation

Higher education

Higher education

Keywords: Quantitative methods,Student learning,Achievement,Learning approaches,Higher education,Qualitative methods,Teaching/instruction,Problem solving,Communities of practice,Researcher education,Competencies,Interdisciplinary,Lifelong learning

Sig's: SIG 24 - Researcher Education and Careers,SIG 4 - Higher Education

Chairperson: Steffi Zander, Bauhaus-Universitat Weimar, Germany

Exploring associations between students' defence styles and approaches to learning

Quantitative methods,Student learning,Achievement,Learning approaches,Higher education

Evangelia Karagiannopoulou, University of Ioannina, Greece; Vasilios Athanasopoulos, University of Ioannina, Greece; Thomas Hyphantis, University of Ioannina, Greece;

The present study is a first attempt to explore relationships between studentsí defense mechanisms, approaches to learning and achievement. The validity and reliability of the DSQ-40 is explored. Three hundred students attending a social science department participated in the study. The study supports the psychometric properties of the DSQ-40. The exploratory factor analysis indicated three defense styles (mature, neurotic, immature). The Cronbach alpha coefficients ranged from medium to high. The statistical analyses indicated a strong positive relationship between a mature defence style and a deep approach to learning. Similar strong

positive correlations were identified between a surface approach and immature and neurotic defense styles. A strategic approach was less strongly related to a neurotic defense style. The only significant (although low) correlation between studentsí GPA and defence styles concerned the mature defence style. Further analysis of the data is in progress. The paper supports recent studies that draw on or refer to a psychodynamic approach to education to discuss studentsí leaning.

Introducing first-year students to the knowledge cultures of law, engineering and teaching

Qualitative methods,Student learning,Teaching/instruction,Problem solving,Higher education,Communities of practice

Monika Nerland, University of Oslo, Norway; Crina Damsa, University of Oslo, Norway; Karen Jensen, University of Oslo, Norway;

This paper examines how students in three Norwegian profession-oriented programs are introduced to the knowledge culture of their profession by way of inquiry-bases activities. We focus on the first courses students take in three programs for legal education, teacher education and engineering education respectively, all of which use inquiry-based group work to introduce students to profession-specific problems and knowledge resources. The paper employs a socio-cultural perspective on knowledge and learning, with special emphasis given to epistemic practices and tool-mediated action as analytical means. Data comprise video-observations of teacher-led sessions and studentsí group work, course documents and materials, student-developed products and group interviews. The analyses reveal differences in the types of problems students work upon, how epistemic practices are made transparent and enacted in these settings, and how knowledge sources are utilized in their inquiry processes. The paper discusses the strengths and challenges to learning that come into view in the three course contexts, and employs a ëcomparative opticí to identify aspects that seem important for introducing newcomers to their prospective knowledge domains.

Personnel Development in Higher Education: Focusing on Academicsí Needs

Qualitative methods,Researcher education,Competencies,Interdisciplinary,Higher education,Lifelong learning

Janina Mundt, Ludwig-Maximilians-Universitat (LMU), Germany; Laura Graf, TU Munich, Germany; Barbara Pangert, LMU Center for Leadership and People Management, Germany; Silke Weisweiler, LMU Center for Leadership and People Management, Germany; Dieter Frey, Ludwig-Maximilians University, Germany;

Excellent scientific work not only requires outstanding professional skills but also competencies in teaching, self-management and leadership. By offering a systematic qualification program tailored to the academicsí needs the LMU Center for Leadership and People Management aims to raise academicsí awareness for their role as leaders and to improve their skills in the area of leadership, self-management and teaching. The aim of our research is to examine the effectiveness of this program based on the evaluation model by Kirkpatrick (2006). In addition

we will give evidence on how these results are determined by the level of academic degree, the area of competence and the assessment of the trainer. Overall ratings show that the participants are very pleased with the program, giving high ratings on satisfaction and utility (reaction), relevant knowledge (learning), self-efficacy and application to practice (behavior) and trainer performance. Moreover the participants are quiet optimistic concerning positive changes due to the seminar, showing an increase from measure point t1 to t2. Also their awareness of their role as an academic leader rises from t1 to t2. In addition we found evidence that the effectiveness of the trainings depends on the academic degree, the area of competence and trainer ratings. Very few studies yet have focused on personnel development in higher education. Our study tries to close this gap by giving evidence on the effectiveness of such a program emphasizing the importance and significance of personnel development in higher education.

Design Education ñ Beyond Canonical Practice

Qualitative methods,Student learning,Teaching/instruction,Higher education,Communities of practice

Christoph Richter, Christian-Albrechts-Universitat zu Kiel, Germany; Julia Albrecht , Christian-Albrechts-Universitat zu Kiel, Germany; Elisa Ruhl, Christian-Albrechts-Universitat zu Kiel, Germany; Heidrun Allert, Christian-Albrechts-Universitat zu Kiel, Germany;

In this paper we explore into the implications that arise when approaching design education from a practice-oriented perspective. Most of the current discussion on practice-based education draws on a canonical understanding of disciplinary and professional practice. However, the idea that there is a coherent and fairly stable set of practices clearly falls short in domains such as design, where different professional paradigms coexist and continuously evolve. Under these conditions practice-based approaches cannot resort to a set of codified practices but have to account for just the plurality and multivoicedness inherent to the disciplinary and professional discourse. Based on the results of an ethnographic field study carried out in an educational design studio at a University of Fine Arts and Design we depict the variety of designerly approaches enacted by the students and trace the pedagogical interventions of the instructor aimed to balance the development of studentsí personal identity and disciplinary attitudes. The results of the case study challenge the idea of practice-based education as a process of mastering disciplinary practice but call attention to the role of different epistemic styles and critical professional action.

M 10

28 August 2015 17:15 - 18:45

Room Brown_B5

Paper Presentation

Instructional design

Instructional design

Keywords: Experimental studies,In-service teacher education,Pre-service teacher education,Teaching/instruction,Competencies,Social sciences,Instructional design,Comprehension of text and graphics,Learning approaches,Reading comprehension,Knowledge creation,Design based research,Synergies between learning, teaching and research,Problem solving,Interdisciplinary,Higher education,Learning analytics,Educational technology,Educational attainment,Technology,Computer-assisted learning

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 2 - Comprehension of Text and Graphics,SIG 6 - Instructional Design,SIG 7 - Learning and Instruction with Computers

Chairperson: Halszka Maria Jarodzka, Open University, Netherlands

Influence of teaching experience, task design and familiarity with students on diagnostic judgments

Experimental studies,In-service teacher education,Pre-service teacher education,Teaching/instruction,Competencies,Social sciences

Katharina Hellmann, University of Freiburg, Germany; Matthias Nuckles, University of Freiburg, Germany;

Teachers should be able to judge the difficulty of learning tasks from a novice perspective, an important sub-skill of diagnostic competency. However, research suggests that teachers as domain experts might be prone to an expert blind spot, using their specialized content knowledge as anchor, thus underestimating the difficulty that a task imposes on novices. Teachers might also underestimate the benefit that task optimization in line with Cognitive Load Theory typically has for novices, as ñ following the expertise reversal effect ñ such tasks increase extraneous load in experts and lead them to judge the tasks as disadvantageous for novices. Teaching experience and familiarity with specific students, however, should have a debiasing effect, resulting in more accurate judgments. In Study 1, 34 pre-service and 22 in-service teachers estimated the difficulty of mathematics tasks for novices. In Study 2, 12 in-service teachers judged the difficulty of these tasks for their own students. Solution frequencies were collected from 52 9th graders (Study 1) and 239 10th graders (Study 2). In Study 1, both teacher groups showed a significant overestimation of student performance which was further moderated by task design. However, teaching experience did not have a debiasing effect, as estimations did not differ between pre-service and in-service teachers. In Study 2, familiarity with the judged students increased judgment accuracy. Teachers judging their own students showed no significant overestimation. Results suggest that pre-service and in-service teachers should be sensitized regarding potential anchoring effects and task design principles to improve the accuracy of diagnostic judgments.

Effects of different levels of text coherence on cognitive load and learning outcomes

Instructional design,Comprehension of text and graphics,Learning approaches,Reading comprehension,Knowledge creation

Janina Lehmann, Ulm University, Germany; Tina Seufert, Ulm University, Germany;

The level of text coherence can influence a learnerís success by reducing extraneous cognitive load and facilitating the generation of a propositional representation. In study 1 students learned with a high or a low coherent text in a between subject design. Results showed the advantages of high coherent material in recall and comprehension. In study 2 we used learning material in 3 different levels of coherence and measured the extraneous cognitive load after testing as well. We could replicate that a higher level of text coherence leads to better learning performance while less coherent materials increased cognitive load compared to the mid coherent version. This is conform to the cognitive load theory and the previous research on text coherence.

Itís All In The Mix: Engaging African-American Women in Computer Science

Design based research,Synergies between learning, teaching and research,Problem solving,Interdisciplinary,Higher education

Jakita O. Thomas, Spelman College, United States; Yolanda Rankin, Spelman College, United States;

Computer Science courses seek to hone studentsí computational thinking capabilities relative to writing pseudo code, analyzing algorithms, and engaging in software development. Oftentimes students fail to recognize the connection between computational thinking in everyday life and its application in academic settings. One context in which people have a great deal of experience and expertise engaging in the design, implementation, and assessment of algorithms is food. A recipe is an exemplar of an algorithm as it represents a well-ordered collection of ingredients and steps that produce a dish in a finite amount of time. This paper describes our experience implementing a module entitled ìItís All In The Mixî, which provides an anchoring experience for African-American undergraduate STEM majors, bridging the gap between studentsí enactment of computational thinking in everyday settings and computational thinking in an introductory Computer Science course.

The power of learning analytics and learning design: A large scale longitudinal study

Learning analytics,Educational technology,Educational attainment,Technology,Higher education,Computer-assisted learning

Bart Rienties, Open University UK, United Kingdom; Lisette Toetenel, Open University, United Kingdom;

While substantial progress has been made in terms of learning design in the last ten years, few studies have linked learning design with actual learning behaviour in online or blended systems. Learning design establishes the objectives and pedagogical plans which can be evaluated against the outcomes captured through learning analytics. However, no empirical study is available linking learning designs of a substantial number of courses with usage of Virtual Learning Environment and learning performance. Using learning analytics techniques (i.e., cluster, correlation, predictive analysis), in this study we compared how 87 modules were designed, and

how this impacted (static and dynamic) VLE behaviour and learning performance amongst 19000+ students. Our findings indicate that academics seem to design modules with an ìinvisibleî blueprint in their mind. Our cluster analyses yielded four distinctive learning design patterns: constructivist, assessment-driven, balanced-variety and social constructivist modules. More importantly, learning design activities strongly influenced how students were engaging online. Learning design activities seem to have an impact on learning performance, in particular when modules rely on assimilative activities. At EARLI, we aim to discuss the affordances and limitations of quantitative modelling of learning design/analytics, and how triangulating qualitative data from various systems can be used to enrich our understanding of learning sciences.

M 11

28 August 2015 17:15 - 18:45

Room Green_A5

Paper Presentation

Language education

Language education

Keywords: Qualitative methods,Second language acquisition,Competencies,Language (Foreign and second),Primary education,Quantitative methods,Bilingual education,Literacy,Language (L1/Standard Language),Secondary education,Case studies,In-service teacher education,Conceptual change,Model-based reasoning,Student learning,Communities of learners

Sig's: SIG 1 - Assessment and Evaluation,SIG 12 - Writing,SIG 2 - Comprehension of Text and Graphics

Chairperson: Anna-Carin Jonsson, University of Gothenburg, Sweden

Characteristics of young learnersí German as a foreign language basic vocabulary

Qualitative methods,Second language acquisition,Competencies,Language (Foreign and second),Primary education

Olga S. Hrebik , University of Szeged, Hungary; Tibor Vigh, University of Szeged, Hungary; Tibor Vidakovich, University of Szeged, Hungary;

The study investigated 12-13 year old studentsí German (FL) basic vocabulary. According to literature, students should acquire the most frequent words of a language at the beginning of learning. Pictures can be used in acquisition of words, as well as in the assessment of studentsí vocabulary. This research aimed at assessing of 6th and 7th grade studentsí word knowledge with visual stimuli. The study focused on the similarities and differences among the beginnersí

and advanced studentsí performances, and on the characteristics of their vocabulary patterns. Six tests of an online test battery were developed for the assessment. 443 6th grade and 389 7th grade students were involved in the measurement. There are no significant differences among the studentsí performances on the tests in the same grades. But the 7th graders achieved significantly better than 6th graders. Based on the strong correlation between the test performances and the length and intensity of language learning, the groups of Ñbeginnersî and Ñadvanced learnersî were compared. The variance analyses based on the characteristics of the tests and of the words in tasks show significant differences between younger beginnersí performances and the othersí. The beginnersí vocabulary is mainly at level A1 with the dominance of the nouns. The word knowledge of the advanced groups is richer. The 7th graders know more A2 level and less frequent words. The online vocabulary test measures studentsí German vocabulary independently of the learning context. A detailed analysis of the scores offers guidelines for further development.

The influence of reading fluency on reading comprehension of second language learners of German

Quantitative methods,Bilingual education,Literacy,Language (Foreign and second),Language (L1/Standard Language),Secondary education

Markus Linnemann, University of Cologne, Germany; Sabine Stephany, University of Cologne, Germany; Necle Bulut, University of Cologne, Germany;

The aim of the present study is to clarify the relationship between reading fluency and text comprehension in second language learners of German. Findings may lead to the development of more effective support for acquiring reading skills of second language learners. Anglo-American research shows a correlation between reading fluency and text comprehension for English language. On the contrary due to a lack of research very little can be said about any relationship between fluency and comprehension in German reading and none can be said about reading in German as a second language. Reading fluency in this study is defined as multidimensional construct consisting of accuracy in word decoding, automatic processing and prosodic reading. We investigated a randomized sample of 29 6th to 10th graders from 15 German secondary schools who took part in a reading fluency test. We expected as one result that there should be a substantial correlation between all components of reading fluency and reading comprehension. The results provide strong support for this hypothesis. The findings can lead to a better understanding of reading skills and to a development of intervention.

Teachersí concepts on grammar instruction and writing

Case studies,In-service teacher education,Conceptual change,Language (L1/Standard Language),Secondary education,Model-based reasoning

Xavier Fontich, University of Exeter, United Kingdom; Anna Camps, Universidad Autonoma de Barcelona, Spain;

We present a case study centred on the debate about the role of grammar in Language Arts, focused on teachersí conceptual thinking. As a result of the great diversity of theories developed during the last decades, different concepts of grammar, grammar instruction and grammar-for-writing coexist, such as the ìexplicit/implicitî approach (rooted on the generative linguistics concepts of ìcompetence-performanceî) and the concept of ìmetalinguistic activityî (based on sociocultural tenets). Although research based on the latter is still scarce, some works consider it far more suitable for reaching a robust theoretical understanding on the processes of conceptualizing grammar and the role it plays in writing. This study aims at analyzing teachersí concepts in the light of these two approaches. Semi-structured interviews have been designed. Preliminary results of an interview to a secondary teacher show that: a) two concepts on what grammar is coexist: grammar as implicit knowledge (ie linguistic competence) and grammar as explicit knowledge of spelling norms; b) Teaching grammar is teaching spelling norms; and c) grammar-for-writing relies on implicit learning that, nevertheless, can be fostered through explicit reflection on grammar (ie metalinguistic activity), which is beneficial but demanding and time-consuming. This teacherís concepts on grammar instruction and writing are installed on the ìexplicit/implicitî dichotomy but the references to metalinguistic activity may be an anchor to shift the focus, through in-service education assistance.

Raising language awareness in early primary: Manipulation tasks, metalanguage, and interaction

Case studies,Student learning,Literacy,Language (L1/Standard Language),Primary education,Communities of learners

Xavier Fontich, University of Exeter, United Kingdom; Susana Gomes Pereira, Faculdade de Ciencias Sociais Humanas, Portugal; Ana Rita Paulo Santos, Higher Education College of Lisbon, Portugal; Maria Adriana Principe Cardoso, ESELx/CLUL, Portugal;

In this paper we present the partial results of a project designed as an experimental study and focused on grammar teaching at early primary school. It has been carried on in Portugal, where curriculum states that assessment on interaction capacity and metalanguage use is to be implemented at the end of Primary level. Research has shown the relevance of both interaction and metalanguage use in observing and manipulating grammar content when complex grammar issues have to be sorted out at late primary school (eg in writing). Although some studies consider this approach to be unsuitable in early primary due to studentsí inability to reason metalinguistically, sociocultural research focused on teacher-student interaction highlight the capacity of early graders to engage in a manipulation task and the use of metalanguage. As research based on small group interaction is still scarce, this study aims to explore first gradersí language awareness when engaged in manipulation tasks within small group interaction. The results show that students attain a high level of language awareness, which is made visible by the wide repertoire of criteria and metalanguage used in classifying words. The implications of these results may be two-fold: early primary is a suitable context for promoting grammar learning based on small group interaction, manipulation, and the use of metalanguage; further research should explore whether it is also beneficial in the writing classroom in early primary.

M 12

28 August 2015 17:15 - 18:45

Room Green_A6

Paper Presentation

Mathematics education

Mathematics education

Keywords: Pre-service teacher education,Teacher professional development,Cognitive development,Mathematics,Higher education,Knowledge creation,Video analysis,Secondary education,Quantitative methods,Neuroscience,Learning disabilities,Numeracy,Primary education,Reasoning,Science education

Sig's: SIG 11 - Teaching and Teacher Education,SIG 22 - Neuroscience and Education,SIG 9 - Phenomenography and Variation Theory

Chairperson: Matthew Inglis, Loughborough University, United Kingdom

Conceptualization of teachersí knowledge: Shifting the attention to the nature and form

Pre-service teacher education,Teacher professional development,Cognitive development,Mathematics,Higher education,Knowledge creation

Thorsten Scheiner, University of Hamburg, Germany;

The overall intent of the theoretical work presented here is to go beyond past trends in the conceptualization of teachersí knowledge by focussing the attention on a structural description of teachersí professional knowledge, in addition to identifying what the teachersí knowledge is about. The guiding philosophy of this work lays in the observation that, along various tendencies of past and current approaches conceptualizing (mathematics) teachersí knowledge, the most dominating one is the focus on the content of teachersí knowledge. Thus, the first part of the presentation provides a grounding for an exploration of new perspectives that focus on how the knowledge teachers need to possess is structured and organized. In the second part, the ëknowledge in piecesí framework developed by diSessa (e.g., 1993) is taken as a productive resource for theoretical reflection on the nature and form of teachersí knowledge, and for providing implications on modelling teachersí knowledge at the ëknowledge levelí. The presentation takes the perspective that the major issues that need better resolution if we are to understand teachersí acquisition of an integrated knowledge base are questions concerning the nature and form of teachersí professional knowledge. New avenues for theoretical reflection on the (re-)conceptualization of (mathematics) teachersí professional knowledge and its implications for empirical research are provided in this presentation.

Examples with variation ñ Teachersí choice and use of mathematical examples

Video analysis,Teacher professional development,Mathematics,Secondary education

Angelika Kullberg, Goteborg University, Sweden; Ulla Runesson, School of Education and Communication, University of Jonkoping, Sweden;

The aim of this paper is to describe differences in the examples generated in lessons, and to discuss the findings in relation to teacher learning. In mathematics teaching the instructional examples used serve as a tool for communication and to make ideas of mathematics accessible to learners. It has been argued elsewhere that the selection of examples is based on knowledge gained foremost from experience of teaching. In this paper the examples the teachers used during instruction are analysed. Six secondary mathematics teachers, teaching 7th grade students, participated in collaborative learning during one and a half years. The analysis is based on video recorded lessons from four of the teachers before and after their partipation in the collaborative learning. Findings from the study show that the teachers seem to have chosen the examples more carefully, and enacted the examples in more structured way after the collaborative learning.

Clarifying the nature of mathematical learning difficulty

Quantitative methods,Neuroscience,Learning disabilities,Numeracy,Mathematics,Primary education

Florence Gabriel, Flinders University, Australia;

Clarifying the nature of the difficulty of mathematics learning is crucial for developing appropriate instruction for children with mathematical learning disabilities (MLD). Mathematical skill has been shown to be built on several cognitive abilities. Thus, potentially a wide variety of MLD can arise from different combinations of defects in various cognitive domains and it is highly unlikely that MLD can be explained by a single factor. In this talk, I will present a study which aimed to understand the nature of mathematical difficulty associated with two markedly different populations of children: children with specific language impairment (SLI) and children with developmental dyscalculia (DD). I will discuss the role of working memory, language and symbolic and non-symbolic number comparison performance in mathematics.

Comparison of perimeters: Effect of mode and order of presentation

Neuroscience,Reasoning,Mathematics,Science education

Reuven Babai, Tel Aviv University, Israel; Laura Nattiv, Tel Aviv University, Israel; Ruth Stavy, Tel Aviv University, Israel;

Studentsí difficulties in science and mathematics may stem from interference of irrelevant salient variables. We focus on the comparison-of-perimeters task, in which area is the irrelevant salient variable. A brain-imaging study related to comparison-of-perimeters task suggested that overcoming this interference is affected by the efficiency of appropriate solution strategies. Such strategies involve mentally moving and/or counting of relevant perimeter segments. Hence, presenting the perimeters of the shapes discretely (drawn as built from matchsticks) might

increase the efficiency of appropriate solution strategies. We explored whether discrete mode of presentation would yield a higher success rate than continuous one and whether an intervention of first performing the discrete mode of presentation would improve studentsí success in a subsequent continuous mode. Success in discrete mode of presentation was higher than in continuous mode. Moreover, success in continuous mode of presentation increased as a result of the intervention (i.e., when performed after discrete mode). Providing students with the opportunity to overcome difficulties by altering the mode or order of presentation is a promising tool for teachers of science and mathematics. In addition, the current paper demonstrates that applying cognitive neuroscience techniques in education research can lead to a deeper understanding of studentsí reasoning processes and to improved teaching.

M 13

28 August 2015 17:15 - 18:45

Room Cyan_F1

Paper Presentation

Metacognition and reflection

Metacognition and reflection

Keywords: Goal orientation,Metacognition,Reflection,Higher education,Workplace learning,Lifelong learning,Experimental studies,Student learning,Competencies,Emotion and cognition,Psychometrics,Assessment methods and tools,Cognitive development,Secondary education,Comprehension of text and graphics,Reading comprehension

Sig's: SIG 1 - Assessment and Evaluation,SIG 16 - Metacognition

Chairperson: Marion Crauwels, KU Leuven, Belgium

Self-Assessment: A Complex Task for Medical Residents

Goal orientation,Metacognition,Reflection,Higher education,Workplace learning,Lifelong learning

Mariette van Loon, Maastricht University, Netherlands; Margje W.J. van de Wiel, Maastricht University, Faculty of Psychology and Neuroscience, Netherlands;

This study examined medical residentsí (N = 91) self-assessment accuracy, and its relation with goal orientation, reflection and performance. Residents completed a case test derived from the Medical Knowledge Self-Assessment Program (MKSAP) and rated their confidence in the accuracy of each response on the case test. Furthermore, they completed questionnaires about goal orientation and engagement in reflection activities. Measures of self-assessment accuracy show that residents are highly overconfident for incorrect responses. Measures of self-reported

reflective activity and measures of self-assessment accuracy did not correspond. Residents with a higher level of mastery-goal orientation self-reported more reflective activities, but also showed lower self-assessment accuracy and lower case test performance. These contradictory findings indicate that it is important to triangulate data on self-assessment by combining self-report questionnaire data with more fine-grained measures of self-assessment accuracy.

The Impact of Perceptual Disfluency when Learning Personal Information on Social Media

Experimental studies,Student learning,Competencies,Emotion and cognition,Metacognition

Stephanie Pieschl, Westfalische Wilhelms-Universitat Munster, Germany; Frank Schmischke, Westfalische Wilhelms-Universitat Munster, Germany; Ricarda Moll, Westfalische Wilhelms-Universitat Munster, Germany;

In the last couple of years studies in educational psychology have shown that disfluency, for example hard-to-read fonts, can cause better learning outcomes when compared to fluent learning conditions. However, overall results are mixed and the conditions under which disfluency constitutes a desirable difficulty are still debated. Up to now, this strand of research has mostly focused on established memory and metacognition paradigms. We contribute to this discussion by investigating disfluency in an informal learning context that is important for digital literacy education: Memory for personal information displayed on social media. In an experiment (N = 72), participants read either fluent or disfluent social media profiles on a sham social networking site (SNS), answered questionnaires about Usability, Trust, and Willingness to Self-Disclose regarding this SNS, and their Memory for the content of the sham SNS profiles was tested. For each memory test item Confidence ratings were collected and their Accuracy was determined. Results show significantly better Memory and Confidence for the disfluent than for the fluent condition; however, fluency had no effects on Accuracy, Usability, Trust, and Willingness to Self-Disclose. Educational implications in general and specifically for digital literacy were discussed.

Self-reflection ability as a facilitator for the validity of self-report instruments?

Psychometrics,Assessment methods and tools,Cognitive development,Metacognition,Reflection,Secondary education

Grete Arro, Tallinn University, Estonia; Kati Aus, Tallinn University, Estonia; Anna-Liisa Jogi, Tallinn University, Estonia;

Ability to think over oneself from different perspectives and understand oneís own emotions, thoughts and behaviour vary according to cognitive ability level. However the self-report scales assume that the ability to validly self-reflect is universal. In samples with varying metacognitive abilities, especially the children and adolescent samples, the differences in self-reflection ability may affect the validity of the self-report instruments. In order to understand oneís ability to reflect upon her/himself we suggested free-response self-reflection instrument. As an example we have chosen to compare correlative associations between studentsí self-reported procrastination and ability beliefs among students with different levels of self-reflection ability.

Preliminary results suggest that self-reflection ability moderates the association between entity beliefs and procrastination, whereas general mental ability does not. The findings would need further support from testing the same effects on other measures that assume the respondent to have a rather proficient level of self-reflective ability in order to give generalized answers to questions concerning the functioning of the Self.

The role of text cohesion and prior knowledge for absolute metacomprehension accuracy

Experimental studies,Student learning,Comprehension of text and graphics,Metacognition,Reading comprehension

Stefanie Golke, University of Freiburg, Germany; Katja Maier, University of Goettingen, Germany; Joerg Wittwer, University of Goettingen, Germany;

Absolute metacomprehension accuracy refers to the ability of readers to accurately predict or judge their performance on a text comprehension test. Research on this absolute accuracy measure is inconclusive showing both overestimation of text comprehension and underestimation. This inconclusiveness might be related to the fact that absolute metacomprehension accuracy seems to depend on both characteristics of the text and the reader. We conducted an experiment (N = 48) that varied text cohesion (high vs. low) as a prominent characteristic of text. As characteristic of the reader, we focused on objective and self-reported prior knowledge. Results showed that participants in general underestimated their test performance both before and after answering the test. However, underestimation was larger in the high cohesion condition than in the low cohesion condition. Moreover, participants with lower self-reported prior knowledge showed a larger underestimation, but only when they had read the high cohesion text. The findings might suggest that participants who read the highly cohesive text experienced no comprehension difficulties during reading and, thus, draw more heavily on their (higher or lower) prior knowledge to form their judgments.

M 14

28 August 2015 17:15 - 18:45

Room Yellow_G5

Paper Presentation

Motivation

Motivation

Keywords: Quantitative methods,Student learning,Self-regulation,History,Secondary education,Motivation and emotion,Goal orientation,Self-efficacy,Primary education,Experimental studies,Teaching/instruction,Achievement,Mathematics,Emotion and affect

Sig's: SIG 8 - Motivation and Emotion

Chairperson: Lauri Hietajarvi, University of Helsinki, Finland

Does Fostering Situational Interest Help to Narrow the Gap Between Teachers and Students?

Quantitative methods,Student learning,Self-regulation,History,Secondary education,Motivation and emotion

Matthias Boehm, University of Passau, Germany; Jutta Maegdefrau, Universitat Passau, Germany; Andreas Michler, Universitat Passau, Germany;

Some teachers have the ability to inspire their studentsí interests, even when some of those students had displayed no former interest in the subject. Recent research suggests that this well-recognized observation might be better understood by separating individual interests, the relatively stable and inherent interests of the student, from situational interests, those interests inspired by a studentís situational context. In a classroom, sparking situational interest through an inspiring educational context will enhance studentsí concentration and attention, hence softening the perceived challenge of difficult topics. The benefits to both student and the teacher, or task designer, are considerable; students more aligned with the teacherís intentions who better self-regulate as a result. This research tests the hypothesis that by improving interest in the classroom, the intentions of the teacher are closer pursued by pupils. The research followed 778 ninth graders in 30 German history classrooms, conducting 12 separate tasks. The results of regression analysis were inconsistent. Whereas situational interest seems to be a good predictor for the gap between intentions of the teachers and studentsí reported use of organization strategies situational interest could not predict memorization and elaboration differences as expected. Implications of our findings and recommendations for further research are discussed.

Motivation in mathematics and language: Degree and stability of domain-specificity

Quantitative methods,Goal orientation,Self-efficacy,Primary education,Motivation and emotion

Lisette Hornstra, Utrecht University, Netherlands; Ineke van der Veen, Kohnstamm Institute, Netherlands; Thea Peetsma, University of Amsterdam, Netherlands;

Previous research indicated that motivation is an important predictor of studentsí achievement outcomes and school careers, but also that for many students, motivation declines as they get older. To understand whether students become less motivated for school in general or whether these declines can be specific to certain subject domains, more understanding of domain-specificity and developmental trajectories of motivation in different subject domains is needed. The purpose of this study was therefore to examine (1) the degree and stability of domain-specificity of different motivational constructs and (2) to examine how motivation in two subject domains, mathematics and language, changes over time; and (3) how developments in domain-specific aspects of motivation are related to achievement growth. A sample of 722 students in upper primary school filled out questionnaires on their motivation in grade five and six on four

measurement occasions. Results of confirmatory factors analyses and Latent Growth Curve Analyses demonstrated that domain-specificity of motivational aspects varied by motivational construct and also varied over time. Furthermore, mean levels of most aspects of motivation were found to decline, but developments differed by construct and subject domain. Moreover, after controlling for gender, socio-economic and ethnic background characteristics, and cognitive ability, domain-specific aspects of motivation hardly predicted developments in achievement. Only self-efficacy in math and language was predictive of progress in achievement in both subject domains.

Effects of example choice and utility intervention on performance and interest in mathematics

Experimental studies,Teaching/instruction,Achievement,Mathematics,Secondary education,Motivation and emotion

Marina Hirnstein, University of Bergen, Norway; Rolf Reber, University of Oslo, Norway;

With decline in interest in mathematics and science in compulsory education, several motivational interventions have been developed to tackle this problem. One of them focuses on how students can utilize the material being taught in their lives, and is therefore called ìutility interventionî (Hulleman & Harackiewicz, 2009). Reber et al. (2009) developed an intervention called example choice that connects formal contents to real life by accommodating the contents to studentís interest. The goal of the current study was to investigate combined effects of these motivational interventions on performance, interest and willingness to learn more about the material. In the present study 937 eighth and ninth grade students learned about probability calculus in one out of nine conditions that resulted from combining three example choice with three utility intervention conditions. According to the results of the present study, learning with interesting examples can increase test performance. Although it does not reduce performance, lack of choice seemed to have detrimental effects on eighth gradersí interest in probability calculus. Emphasizing utility of the material, however, kept them interested in the material even when they did not have a choice. It was also found that writing about the material leads to higher performance in the ninth grade, regardless of the instruction and nature of the writing assignment. These findings provide insight into specific effects of example choice and utility intervention and can be used in developing teaching practices that enhance interest and performance in mathematics, tailored to specific groups of students.

The dark side of motivation: Controlling Teaching in relation to students' motivation

Quantitative methods,Teaching/instruction,Emotion and affect,Secondary education,Motivation and emotion

Leen Haerens, Ghent University, Belgium; Nathalie Aelterman, Ghent University, Belgium; Maarten Vansteenkiste, Ghent University, Belgium; Bart Soenens, Ghent University, Belgium; Stijn Van Petegem, Ghent University, Belgium;

Objectives: Grounded in Self-Determination Theory (SDT), this study examined the mediating role of studentsí experiences of need satisfaction and need frustration in associations between perceived teaching style and studentsí motivation and oppositional defiance in the context of physical education. Specifically, we tested an integrated model including both a ëbrightí path from perceived autonomy-supportive teaching through need satisfaction towards autonomous motivation and a ëdarkí pathway from perceived controlling teaching through need frustration towards controlled motivation, amotivation, and oppositional defiance. Design: Cross-sectional study. Methods & Results: Based on structural equation modelling in a sample of 499 secondary school students (44% boys, Mage = 15.77 + 1.16), we found that perceived autonomy-supportive and controlling teaching, as well as need satisfaction and need frustration, constitute different constructs relating distinctively to motivational outcomes. Consistent with the notion of a bright and dark path, perceived autonomy support was related primarily to autonomous motivation, with need satisfaction mediating this association, whereas perceived controlling teaching was related primarily to controlled motivation and amotivation, through need frustration. Perceived controlling teaching also displayed a direct and unique relationship with oppositional defiance. Conclusions: To more accurately capture the detrimental effects of controlling teaching, this teaching dimension along with its consequences in terms of need frustration and motivational outcomes needs to be studied in its own right. It is also discussed that effective teacher training may raise awareness among teachers about the motivational risks associated with controlling practices.

M 15

28 August 2015 17:15 - 18:45

Room Orange_E1

Paper Presentation

Problem solving and reasoning

Problem solving and reasoning

Keywords: Experimental studies,Student learning,Problem solving,Mathematics,Higher education,Integrated learning,Quantitative methods,Secondary education,Problem-based learning,Cognitive development,Reasoning,Interdisciplinary,Psychometrics,School effectiveness,Primary education

Sig's: SIG 1 - Assessment and Evaluation,SIG 14 - Learning and Professional Development,SIG 4 - Higher Education

Chairperson: Jan Elen, KU Leuven, Belgium

The benefits of self-explanation for more difficult types of transfer problems

Experimental studies,Student learning,Problem solving,Mathematics,Higher education,Integrated learning

Daniel Dinsmore, University of North Florida, United States;

This investigation extends previous studies by exploring how and why self-explanation can increase positive transfer across two types of problems (i.e., near-perceptual and far-conceptual). Further, this study examined the impact of self-explanation on negative transfer. Participants from a university in the Southeastern United States were randomly assigned to a self-explanation and no self-explanation condition as well as a near-perceptual or far-conceptual problem condition. Participants learned how to use multiplicative probability, applied it to a base problem, then were asked to transfer that learning to a new problem (either the near-perceptual or far conceptual) by either using self-explanation or not (i.e., control). Results indicated that self-explanation was particularly helpful for individuals in the far-conceptual condition, but no effects of self-explanation were found for negative transfer. Individualsí self-explanations revealed some reasons why it was helpful for these more difficult problems as well as why it was not helpful in mitigating negative transfer for some participants.

Business pre-university studentsí perceptions of the learning environment and learning outcomes

Quantitative methods,Student learning,Problem solving,Secondary education,Problem-based learning

Quincy Elvira, Radboud University Nijmegen, Netherlands; Sven De Maeyer, University of Antwerp, Belgium; Mien Segers, Maastricht University, Netherlands;

The recognition of the importance of problem-solving skills in formal education is apparent in recent changes in international tests as well as national curricula. Already for a long time, problem solving has been the focus of attention in expertise development research. Various expertise development research studies suggest that during formal education both learning environments as motivational variables have an influencing role in developing expertise in terms of quality in problem solving. This study addresses the role of the learning environment in terms of instructional principles, as well as studentsí interest in the subject in the quality of their problem representation, diagnosis, solution and decisions. The sample consisted of 213 pre-university students following a business track in the Netherlands. The results of path analyses indicated the role of two instructional principles ëself-control and selfí-regulationí and ësupport for learningí for the quality of problem solving. Furthermore, individual interest was found to be a mediating variable to the quality of problem solving. Moreover, testing the model in subsamples of 62 10th (M=15,48 years) 83 11th (M=16,82 years) and 68 12th graders (M=17,44 years) revealed no differences between the subsamples (??2 (46, N = 213) = 44.752, p >.05). These findings can inspire teachers on how to optimize instruction in order to enhance the quality of studentsí problem-solving.

Critical thinking in college freshmen: The impact of secondary and higher education

Quantitative methods,Cognitive development,Problem solving,Reasoning,Interdisciplinary,Higher education

Marie Evens, KU Leuven, Belgium; An Verburgh, Katholieke Universiteit Leuven, Belgium; Jan Elen, KU Leuven, Belgium;

Critical thinking (CT) helps students to confront a multitude of challenges that they will face in their careers and personal lives. Hence, it is an important task of higher education (HE) to promote studentsí CT. However, students do not enter higher education as a blank slate. Background characteristics of students should be considered when developing instruction. The present study investigates the impact of studentsí secondary education (SE), a background characteristic that has been shown to be related to several study-related variables in HE, on CT in the first year of HE. More precisely, the impact of the educational track in SE (academic, technical/artistic) is studied. Furthermore, it is investigated whether this relation differs in different types of HE. The CT of college freshmen is measured by the Scipio, an instrument consisting of both constructed response items and forced choice items. The results indicate that (1) the growth in CT during the first year of HE is on average small, (2) students with a background in academic SE have higher entrance performances and show more CT growth during the first year than students with other educational backgrounds, (3) students in professional bachelor programs grow more in CT during the first year of HE than students in academic bachelor programs, and (4) there is an interaction effect between educational track in SE and program type in HE (professional or academic) on CT growth and performance.

General and specific thinking skills and schooling

Psychometrics,School effectiveness,Cognitive development,Reasoning,Interdisciplinary,Primary education

Mari-Pauliina Vainikainen, University of Helsinki, Finland; Jarkko Hautamaki, Helsinki University, Finland; Risto Hotulainen, University of Helsinki, Finland; Sirkku Kupiainen, University of Helsinki, Finland;

Enhancing thinking skills is an important goal of formal education. Their role has become increasingly important in the 21st century due to the major changes in working life. Even if the fostering of thinking skills is embedded in the curriculum as it is in Finland today, there is only limited information available about schoolsí success in this task. The present study has two goals: Firstly, to find support for the theoretical assumption of the nested structure of thinking skills with a core factor of formal thinking and specialised structures for verbal and quantitative reasoning; and secondly, to test the differentiated development of these skills in school. This is done by studying class-level variation of sixth gradersí thinking skills in a multilevel factor analysis when initial between-class differences at grade three had been taken into account. The data (N=1543) were drawn from a learning to learn panel study in one of the major cities of Finland. The results show that the core factor for formal thinking could be identified at both the individual and the class level, and that at the individual level, there were statistically significant residual factors for verbal and quantitative reasoning. Initial between-class differences explained

only a third of the variance of class-level formal thinking. This is interpreted to indicate the effect of schooling, i.e., the impact of different teachers, in enhancing general thinking skills.

M 16

28 August 2015 17:15 - 18:45

Room Green_A7

Paper Presentation

Research methodology

Research methodology

Keywords: Mixed-method research,Assessment methods and tools,Competencies,Self-regulation,Higher education,Case studies,Content analysis,Qualitative methods,Quantitative methods,In-service teacher education,Attitudes and beliefs,Phenomenography,Student learning

Sig's: SIG 11 - Teaching and Teacher Education,SIG 17 - Qualitative and Quantitative Approaches to Learning and Instruction,SIG 9 - Phenomenography and Variation Theory

Chairperson: Asa Wengelin, University of Gothenburg, Sweden

The assessment of university competencies. The vision of teachers

Mixed-method research,Assessment methods and tools,Competencies,Self-regulation,Higher education

Maite Fernandez Ferrer, University of Barcelona, Spain; Elena Cano, University of Barcelona, Spain; Anna Fores, University of Barcelona, Spain; Georgeta Ion, Universidad Autonoma de Barcelona, Spain;

This paper presents a research that compares the perceptions about acquiring and developing competencies of old diploma holdersí to students of the new degrees in the European Higher Education Area (EHEA) analyzing the changes that there may be regarding the work by competencies and the role that assessment might have had in such process. This experience is framed within the project ìThe education assessment impact on competencies development in the university. The first graduate perspectivesî (EDU2012-32766) carried out in seven different Spanish universities in the degrees of Teacher in Primary Education, Pharmacy, Computer Engineering, and Industrial Electronics Engineering. Specifically, in this article we present a part of the research in which, using questionnaires, it has been known the university teachersí perceptions and opinions about the competencies they believe their students from the new degrees in the EHEA have developed in higher education and the role they think assessment have had as a contributor to these competencies development. The results presented below are based on a sample of 105 higher education teachers and they show that the main competencies

acquired by students during university are the ìinterpersonal and interaction skillsî, the ìability to work in a teamî and the ìskills in the use of information and communications technologiesî. In relation with the competency-based education in the new degrees, teachers consider that the keys to improve the way in which students acquire and develop competencies are learning activities in Personal Learning Environment (PLE), collective works and internships promoted from the university.

Divergent results within individuals from mixed-method analysis - what should we do?

Case studies,Content analysis,Mixed-method research,Qualitative methods,Quantitative methods,Assessment methods and tools

Robbert Smit, University of Teacher Education St. Gallen, Switzerland; Judith Schoonenboom, University of Vienna, Austria;

Often in a mixed-method study a sequential design is used for a better understanding of the research objects. For example, a researcher collects quantitative data and after analysing the data decides that further qualitative data is needed in order to gain a better understanding of how persons behave in the situations of interest. But what should we do if certain persons seem to behave differently in the two datasets after merging them? Based on selected teacher data with a focus on assessment methods in small, rural schools from the project ìschools in alpine regionsî, we describe the not uncommon problem in mixed-method research of diverse results for two methods (Miller & Gatta, 2006) and discuss possible explanations. As a solution to the divergent results on the individual level, we tried to cluster the data on a higher group level and mix the results again (Tashakkori & Teddlie, 2010, pp. pp. 448-450). Both data sets were re-analysed using latent class analysis (Vermunt & Magidson, 2002) resulting in two group models which showed strong likeness for the focused construct of assessment practices. In the sense of diverse testing (Miller & Gatta, 2006) or triangulation the two data sets then showed similar results for the phenomenon or theory. Finally, we could go back to the individual level and check whether the same person belongs to the same group in both group models.

Epistemic Beliefs of teaching degree studentsñOptimizing the Quality of Questionnaire Translations

Quantitative methods,In-service teacher education,Attitudes and beliefs,Higher education

Jessica Bilz, Universitat Passau, Germany; Marie Lippmann, TU Dresden, Germany; Susanne Narciss, Technische Universitat Dresden, Germany;

Epistemic beliefs are individual beliefs about the nature of knowledge and knowing. These beliefs - as one type of teacher beliefs - influence teaching and studentsí academic achievement on various levels, such as motivation and deductive reasoning. Epistemic beliefs are typically assessed with questionnaires. In Germany, the questionnaires that are used are usually based on translations of original English questionnaires. However, the translated questionnaires mostly achieve lower validity and reliability values than the original English questionnaires. One reason for this may be a lack in translation quality. Hence, this study aimed to investigate the impact of

translation quality on the reliability of one questionnaire to assess epistemic beliefs. First, the original English items from one questionnaire on epistemic beliefs (Conley et al., 2004) were translated verbatim, and then adapted to the German language using the recommended multi-stages method from (Guillemin et al.,1993). The new translation and a more or less verbatim translation from (Urhahne & Hopf, 2004) were empirically tested on 175 university students. Item analyses revealed that the new questionnaire translation achieved higher scale reliabilities than the verbatim translation. An exploratory factor analysis with varimax rotation revealed that more variance can be explained when using the translation-method from (Guillemin et al., 1993) than the verbatim translation suggested by Urhahne and Hopf (2004).

Differentiation and integration of phenomengraphic research: Dialogue between two faces of variation

Phenomenography,Qualitative methods,Student learning

Ming Fai Pang, University of Hong Kong, China; Wing-wah Ki, The University of Hong Kong, Hong Kong;

This paper will revisit and discuss the phenomenographic research movement in the light of Pangís (2003) paper which made use of the notion of ìtwo faces of variationî to signify the emphases of the two different but interconnected phases or areas of phenomenographic research. The former refers to the traditional phenomenographic research which investigates variation in peopleís ways of experiencing phenomena, whilst the latter refers to the application of the variation theory of learning to account for peopleís ways of experiencing phenomena and subsequently to improve the learning and teaching through learning study. There is a thread running through the whole phenomenographic research movement, namely its interest in variation. However, it is important to note that it focuses on different senses of variation in the two phases. A review of its recent development indicates that these two senses of variation continue to develop and flourish. The former proceeds to examine the variation between peopleís experiences of the same phenomenon through analysing their own actions and interactions with others in relatively naturalistic settings. The latter proceeds to various learning studies that investigate how learning can be afforded by different patterns of variation and invariance in the design of learning and teaching. However, research on the second sense of variation has never displaced the importance of the first. In principle, these two different research emphases are complementary to each other, which can make the phenomenographic research tradition more powerful. Yet a lot depends on the dialogue between the two groups of researchers.

M 17

28 August 2015 17:15 - 18:45

Room Brown_B3

Paper Presentation

School effectiveness

School effectiveness

Keywords: Quantitative methods,Educational policy,School effectiveness,Teaching/instruction,Achievement,Secondary education,Meta-analysis,Student learning,Problem-based learning,Attitudes and beliefs,Professions and applied sciences,Conversation/ Discourse analysis,Cultural psychology,Learning approaches,Interdisciplinary

Sig's: SIG 18 - Educational Effectiveness,SIG 23 - Educational Evaluation, Accountability and School Improvement,SIG 25 - Educational Theory

Chairperson: Maria Evangelou, University of Oxford, United Kingdom

Teachers' use of evaluation data to improve instruction and its effects to student achievement

Quantitative methods,Educational policy,School effectiveness,Teaching/instruction,Achievement,Secondary education

Sebastian Wurster, Deutsches Institut fur Internationale Padagogische Forschung (DIPF), Germany; Dirk Richter, Humboldt Universitat zu Berlin, Germany;

The study investigates the use of different evaluation data by teachers and its relationship to student achievement. Applying the theoretical frameworks of Creemers and Kyriakides (2008) as well as Visscher and Coe (2003) the study analyses data from three different sources: self-evaluation, state-wide comparison tests and centralized examinations. The sample includes N = 934 math teachers who have experience with at least one of the three evaluation procedures. Multilevel analyses to investigate the effects of data use to student achievement are based on a subsample of N=360 teachers with N=2482 students. The results show that a substantial number of teachers (69% to 79%) use evaluation results for data-based development of teaching. Furthermore, data from different sources are used jointly to deduce the same improvement measure. Multilevel analyses revealed no significant effects of several data-based improvement measures on student achievement in mathematics, when controlling for the socio-economic background, gender, cognitive abilities and ethnicity at student level as well as controlling for the class composition and type of school at teacher level.

Problems of meta-meta-analysis: A re-analysis of Hattieís findings on problem-based learning

Meta-analysis,School effectiveness,Student learning,Teaching/instruction,Achievement,Problem-based learning

Christof Wecker, Ludwig-Maximilians-Universitat (LMU), Germany; Freydis Vogel, Technische Universitat Munchen, TUM School of Education, Germany; Andreas Hetmanek, Ludwig-Maximilians-Universitat (LMU), Germany;

John Hattieís synthesis of more than 800 meta-analyses could be regarded as an intriguing means of resolving contested issues such as the effectiveness of Problem-Based Learning (PBL). Problems of this approach, however, include the loss of distinctions concerning important moderator variables, the lack of an assessment of between-studies heterogeneity, and overlapping sets of primary studies. Therefore, the present re-analysis of Hattieís dataset concerning PBL and the underlying primary studies addressed the extent to which his findings about PBL are sensitive to these methodological issues. Hattieís synthesis of eight meta-analyses was re-calculated based on a more complete dataset using a fixed-effects model with precision weighting. Furthermore, the full dataset of primary studies was reconstructed from the tables in the original meta-analyses and analyzed using a random-effects model. The findings revealed that Hattieís estimate for the mean effect of PBL is significantly lower than the one from a meta-meta-analysis that fully exploits the available information. The correct random-effects estimate of the mean effect, although only slightly above the threshold for a small effect, places PBL 12 ranks higher in Hattieís list of factors influencing achievement. Furthermore, the decision to synthesize only overall mean effects conceals differential effects of PBL on knowledge (d = 0.02) and skills (d = 0.34). It is concluded that complete and structurally unambiguous tables of primary studies in meta-analyses, as well as a shared understanding of essential moderator variables, are a minimum requirement for the feasibility of meta-meta-analyses that meet recent meta-analytical standards.

Is a heterogeneous classroom composition a stressor for primary school teachers?

Quantitative methods,School effectiveness,Attitudes and beliefs,Professions and applied sciences

Wolfram Rollett, University of Education Freiburg , Germany; Katja Scharenberg, University of Bern, Switzerland; Wilfried Bos, TU Dortmund University, Germany;

In the research on teacher stress, workplace characteristics and their importance for health and wellbeing are frequently addressed. Yet, the effects of differences in classroom composition on teachersí strain have not been a topic of systematic empirical research. Based on the Erfurt model of school stress and strain (Bohm-Kasper et al., 2001) we raise two research questions: 1.) Which dimensions of classroom composition are important for teachersí occupational strain? 2.) Are these effects mediated by processes of subjective interpretation as assumed in the model of Bohm-Kasper et al. (2001)? The study KESS4 ("Competencies and attitudes of students - grade 4", Bos & Pietsch, 2006) provides data of 306 primary school teachers in Hamburg/Germany and indicators of the composition of their classes (total of 6,889 students): average level and heterogeneity of reading achievement, average level and heterogeneity of social composition (HISEI) and proportion of students with migration background. For time strain and psychophysical strain, none of the indicators of classroom composition proves to be a significant predictor. Analyses for mediating and moderating effects of differences in job satisfaction (indicating the subjective interpretation of stressors) also showed no significant results. Overall, our findings suggest that different dimensions of classroom composition are not psychologically relevant stressors for primary school teachers. Primary school teachers seem to deal with a more heterogeneous classroom composition in their teaching so that it has no unfavorable effects on their perceived occupational strain.

Comprehension as affection: Towards an understanding of dialogic teaching effectiveness

Conversation/ Discourse analysis,Cultural psychology,Learning approaches,Interdisciplinary

Antonia Larrain, Universidad Alberto Hurtado, Chile;

Since the mid 1960s, classroom discourse has caught the attention of many scholars committed to the understanding of educational processes, particularly learning. Drawing from both empirical observations and theoretical considerations, some authors (Alexander, 2001; Mercer & Littleton, 2007; Nystrand, 1997; Wells; 1999) have endorsed some ideas about which type of educational dialogues would encourage learning and thinking development. The common point is that what they call dialogic teaching would foster conceptual gains. In fact, there is some empirical evidence supporting this approach (Howe, 2009). The question that follows is why. What is learn and to comprehend that is promoted by dialogic teaching? This theoretical paper is aimed at exploring the notion of comprehension drawn on the works of Spinoza (1967/1994) and Bakhtin (1981). Spinozaís theorization of affection and Bakhtinís ideas on active understanding will be systematically reviewed. I propose to conceive of comprehension as a specific process of affection or reply that take into account not just the propositional content of the speakerís utterance but the whole discursive field that is been transformed by it. Since every utterance occurs in a background of contradictory and struggling opinions, to comprehend is to reply to those tacit struggles. To comprehend, then, involves some intellectual techniques that orient the exploration of this contradictory and tensioned field (some of them involved in the dialogic teaching approach). In addition, to comprehend involves an affective dimension related to how these struggles affected our own identity and self, that is, how these struggles are felt by me.

M 18

28 August 2015 17:15 - 18:45

Room Green_A8

Paper Presentation

Self-regulation

Self-regulation

Keywords: Content analysis,Educational technology,Self-regulation,Interdisciplinary,Informal learning,Lifelong learning,Qualitative methods,Teaching/instruction,Vocational education,Achievement,Cognitive development,Mathematics,Reading comprehension,Primary education,Quantitative methods,Student learning,Developmental processes,Motivation and emotion

Sig's: SIG 14 - Learning and Professional Development,SIG 22 - Neuroscience and Education,SIG 5 - Learning and Development in Early Childhood,SIG 7 - Learning and Instruction with Computers

Chairperson: Bas Giesbers, Rotterdam School of Management, Erasmus University, Netherlands

Self-regulated learning behaviour and MOOC participation

Content analysis,Educational technology,Self-regulation,Interdisciplinary,Informal learning,Lifelong learning

Colin Milligan, Glasgow Caledonian University, United Kingdom; Allison Littlejohn, Open University, United Kingdom;

Massive Open Online Courses (MOOCs) are typically designed around a self-guided format that assumes learners can regulate their own learning, rather than relying on teacher guidance. However, MOOCs attract diverse groups of learners, many of whom have difficulty with self-regulation. This study examined how health professionals regulated their learning in a MOOC: Fundamentals of Clinical Trials offered by Harvard and edX. The study addresses the research question: What self-regulated learning (SRL) strategies do professional learners apply in a MOOC? A self-report instrument was used to measure SRL factors, which are an indicator of good self-regulation. The instrument produced an SRL profile for each learner, surfacing individual assessments of how professionals self-regulate their learning. Profiles were supplemented by qualitative data from 35 interviews, which exposed how each learner enacted each SRL sub-factor. Learners with high and low SRL scores described qualitatively different levels of self-regulation. When mapped against qualitative data about each learnerís SRL strategies, the profiles appear to provide a fair representation of the learning process. These profiles could be provided to learners to help them reflect on their learning. Improved understanding of their own capacity to self-regulate their learning may guide learners to improve their learning and development.

Occurrences and quality of teacher and student strategies for selfregulation in hands-on simulations

Qualitative methods,Teaching/instruction,Self-regulation,Vocational education

Anne Khaled, HU University of Applied Sciences, Netherlands;

For many decades, teacher-structured hands-on simulations have been used in education mainly for developing procedural and technical skills. Stimulating contemporary learning outcomes suggests more constructivist approaches. The aim of this study is to examine how self-regulated learning (SRL), an important constructivist learning environment characteristic, is expressed in hands-on simulations. Via structured observations of teachersí promoting SRL strategies and studentsí SRL strategies in eight hands-on simulations, along the three phases of SRL (Zimmerman 2001), this study is the first to expose whether students and teachers use SRL in hands-on simulations, what how these strategies look like, and what their quality is. The results show that both students and teachers demonstrate SRL behaviour in the forethought, performance, and reflection phase to some extent, but that they vary considerably in their occurrences, form, and quality and provide opportunities for improvement. Overview in this

paper show occurrences of SRL and exemplary teacher and student behaviours in the SRL phases with lower, medium, and higher quality in hands-on simulations.

Developmental profiles of self-regulation: Their relations to math and reading skills development

Achievement,Cognitive development,Self-regulation,Mathematics,Reading comprehension,Primary education

Katrin Magi, Tallinn University, Estonia; Eve Kikas, University of Tallinn, Estonia; Mairi Mannamaa, University of Tallinn, Estonia;

This longitudinal study investigated the development of cognitive and behavioral aspects of self-regulation and their relations to math and reading skills at the beginning of elementary school. Planning and task persistent behavior (as the cognitive and behavioral aspects of self-regulation) were assessed in the classroom context. Participants were 856 children (mean age at the beginning of school 7.46, SD = 0.52). Using a person-oriented approach, four developmental profile groups of self-regulation were differentiated. Math and reading skills at the beginning of Grade 1 and at the end of Grade 3 differed in these profile groups. The results showed that the development of the cognitive and behavioral aspects of self-regulation varies individually and that the associations between the cognitive and behavioral aspects of self-regulation differ at different time-points. The explained variance between developmental profile groups was greater in Grade 3 for complex math and reading tasks (problem solving, reading comprehension) as compared to less complex tasks (calculation, word reading fluency).

Early temperament and age at school entry as predictors of task avoidance in elementary school

Quantitative methods,Student learning,Developmental processes,Self-regulation,Primary education,Motivation and emotion

Riikka Hirvonen, University of Jyvaskyla, Finland; Minna Torppa, University of Jyvaskyla, Finland; Jari-Erik Nurmi, University of Jyvaskyla, Finland; Kenneth Eklund, University of Jyvaskyla, Finland; Timo Ahonen, University of Jyvaskyla, Finland;

This study examined the role of temperament, pre-reading skills, and age at school entry in the development of Finnish childrenís task avoidance in learning situations. Teachers rated the task-avoidant behavior of 198 participants in kindergarten and twice in Grades 2 and 3. Parents rated the childrenís temperament at age 3 and childrenís pre-reading skills were measured at age 5. The results showed that, on average, the level of childrenís task avoidance remained the same from kindergarten to Grade 2 Fall, but decreased from Grade 2 Fall to Grade 3 Spring. A low level of task avoidance was predicted by high pre-reading skills, effortful control, and negative affectivity. Surgency and negative affectivity predicted decreases in task avoidance from kindergarten to Grade 2 Fall, and from Grade 2 Fall to Grade 3 Spring, respectively. Finally, task avoidance of the oldest children in the classrooms decreased more from kindergarten to Grade 2 Fall, whereas younger childrenís task avoidance decreased particularly from Grade 2 Fall

onward. The findings highlight the contribution of childrenís individual characteristics to the development of their behavioral responses in learning situations.

M 19

28 August 2015 17:15 - 18:45

Room Blue2_D1

Paper Presentation

Teacher professional development

Teacher professional development

Keywords: Mixed-method research,Teacher professional development,Secondary education,Communities of learners,Communities of practice,Qualitative methods,Reflection,Environmental education,Workplace learning,Learning in context,Quantitative methods,Pre-service teacher education,Competencies,Higher education,In-service teacher education

Sig's: SIG 11 - Teaching and Teacher Education,SIG 14 - Learning and Professional Development

Chairperson: Annabel Watson, University of Exeter, United Kingdom

Professional development and educational innovation in Teacher Design Teams

Mixed-method research,Teacher professional development,Secondary education,Communities of learners,Communities of practice

Floor Binkhorst, University of Twente, Netherlands; Adam Handelzalts, University of Twente, Netherlands; Cindy Poortman, University of Twente, Netherlands; Wouter R. van Joolingen, Utrecht University, Netherlands;

Teacher Design Teams (TDTs) are professional development programs for secondary school teachers that promote teachersí professional growth and sustainable implementation of educational innovations. In a TDT, a group of teachers that is supported by a team coach collaborates on designing educational materials and improving their classroom practice. In this study, we aimed to develop a descriptive framework for TDTs. We first developed a conceptual framework for TDTs based on previous research covering three stages: input, process and outcomes. Subsequently, perceptions of former TDT participants were explored to validate and to improve this framework. We used a mixed methods research design consisting of a questionnaire to obtain general insights about perceptions on TDTs (94 respondents) and interviews to obtain in-depth explanations (13 respondents). On average, participants were positive about most TDT outcomes, although clear differences in perceptions about different

TDTs are found, in both the outcomes and input and process factors. Relations between these factors were further explored in the interviews. For example, in one TDT the respondents were externally motivated to participate (input), which related to a lack of optimism during the process and less positive perceptions about the outcomes. The perceptions could be interpreted in terms of our framework. Therefore, it can be used as a tool to describe the way TDTs function. Respondents indicated specific actions the team coach could have taken to better support the team's process. This leads to a refinement of the descriptive framework, in which the team coach is placed as a central actor.

Teachers' dealing with issues in education: A storyline perspective

Qualitative methods,Teacher professional development,Reflection,Environmental education,Workplace learning,Learning in context

Gonny Schellings, Eindhoven University of Technology, Netherlands; Anna Van der Want, Eindhoven University of Technology, Netherlands; Quinta Kools, Fontys University of Applied Science, Netherlands; Rita Schildwacht, Fontys University of Applied Science, Netherlands; Janine Mommers, Eindhoven University of Technology, Netherlands; Corry Kocken-van Acht, Eindhoven University of Technology, Netherlands;

The present study is based on a story-line method in which 23 teachers with an average of 22 years of teaching experience reflect about events they have experienced to be troublesome throughout their own careers. The teachers rated 13 case descriptions about different educational situations. Each situation has been proved to be challenging for beginning teachers (Pillen, Brok & Beijaard, 2013). In our study, experienced teachers were asked to indicate whether they recognized the case description as troublesome for their teacher colleagues and to depict in a graph how the situation was recognizable in various phases of their own career. The results showed that the challenges of some situations (e.g. being strict) decreased during the career, but other challenges continued or even increased (e.g. experienced workload). Remarkably, at any point of their career, the experienced teachers did not feel troubled by conflicts between educational orientations and personal ideals. This study leads to new questions, such as, how beginning teachers cope with challenging situations. In induction programmes, beginning teachers need support in dealing with those situations; and the support should focus on the situations that are troublesome at the start of their career, but also on the situations that remain troublesome throughout all phases of teachersí careers.

Interrelations between student teachersí agency and learning environment in teacher education

Quantitative methods,Pre-service teacher education,Competencies,Higher education,Learning in context

Auli Toom, University of Helsinki, Finland; Janne Pietarinen, University of Eastern Finland, Finland; Tiina Soini-Ikonen, University of Tampere, Finland; Kirsi Pyhalto, University of Oulu; University of Helsinki , Finland;

During teacher education, student teachers are expected to learn professional capabilities relevant for their future work as teachers. Active learning i.e. professional agency in the professional community is one of the key capabilities for teachers in order to be able to not only to cope with changing working environment, but also to be able to promote school development and student learning. Teacher education plays an important role in cultivating student teachers will and abilities to learn from and within their future professional community. This study explores the Finnish first year primary teacher studentsí (N=244) sense of professional agency in the professional community, experienced learning environment in teacher education and interrelation between these two. The analysis was carried out by using SEM. The results showed that student teachersí sense of professional agency in the professional community consisted of complementary components of utilizing feedback, appreciating collective efficacy, sense of community, striving for development, and active help-seeking. Especially social support, equality, climate and recognition as the characteristics of the learning environment in teacher education contributed to studentsí sense of professional agency in the professional community. The results show that the student teachersí sense of professional agency and the perceptions of learning environment were intertwined. This indicates that learning environment provided by teacher education from the very beginning of the studies is crucial in terms of facilitating student teachersí sense of professional agency in the professional community.

Early Career Teachers and Resilience: Wisdom from the field

Qualitative methods,In-service teacher education,Teacher professional development,Reflection,Workplace learning,Learning in context

Rosie Le Cornu, University of South Australia, Australia;

This paper is based on a collaborative qualitative research project funded by the Australian Research Council that investigated the question ëWhat conditions are conducive to promoting teacher resilience in the first two years of teaching?í The research team consisted of seven chief investigators from three Australian Universities and eight stakeholder organizations. The methodology for the study was a critical enquiry drawing on the traditions of narrative enquiry and critical ethnography. The data were collected through two semi-structured interviews with 60 early career teachers and one interview with their principals. Our analysis, based on an initial thematic analysis followed by the use of NVivo8 software, identified five major themes or domains that support early career teacher resilience. The domains are: (a) relationships, (b) school culture, (c) teacher identity, (d) teachersí work, and (e) system policies and practices. This paper presents the findings of a selected set of the data around the advice this group of teachers would give to new early career teachers and discusses them in the light of insights afforded by the larger study. It will be seen that the advice proffered by this group of early career teachers focused above all else on the nature of teachersí work and managing the role of teacher. This key insight is discussed in the paper, together with the implications for early career teachers, leaders and teachers in schools, teacher educators, and systems/policy personnel.

M 20

28 August 2015 17:15 - 18:45

Room Brown_B6

Paper Presentation

Teacher professional development

Teacher professional development

Keywords: Quantitative methods,Teacher professional development,Emotion and affect,Professions and applied sciences,Higher education,Motivation and emotion,Video analysis,Pre-service teacher education,Reflection,Primary education,Knowledge creation,Mixed-method research,Attitudes and beliefs,Values education

Sig's: SIG 11 - Teaching and Teacher Education

Chairperson: Nils Buchholtz, University of Hamburg, Germany

Measuring well-being in positive psychology students and developing tools for teacher education

Quantitative methods,Teacher professional development,Emotion and affect,Professions and applied sciences,Higher education,Motivation and emotion

Lotta Uusitalo-Malmivaara, University of Helsinki, Finland;

The purpose of this study was to measure well-being and its predictors in adult positive psychology students (n=354). Measures of grit (Duckworth & Quinn, 2009), hope (Snyder et al., 1991), flourishing (Diener et al., 2009), subjective happiness (Lyubomirsky & Lepper, 1999), a list of potential threats for present well-being (developed by authors) and a qualitative question concerning future hopes were applied in an electronic questionnaire. Flourishing (conceptualized according to Fredrickson, e.g. 2013, as both ìfeeling good and doing goodî) was set as a target variable. In regression analysis, flourishing was accounted for by global happiness and hope and to a lesser extent, grit and loneliness. Overall, students showed high happiness and flourishing and reasonable grit and hope. Potential threats for their present well-being were economic uncertainty, inadequacy and self-criticism. Qualitative data on future hopes concerned mainly immaterial issues, such as health, family and other social relationships, and meaningful job. This study served also as a piloting research for Finnish versions of some of these focal positive psychology scales. The preliminary analysis of psychometric properties of all measures was encouraging and supported their further use. Our aim is to employ them as part of both academic teacher education and pedagogical field applications. Implications for use of well-being measurements in various educational settings are discussed.

Triggering practice of teaching: Student teacher learning of action-oriented knowledge

Video analysis,Pre-service teacher education,Reflection,Professions and applied sciences,Primary education,Knowledge creation

Jukka Husu, University of Turku, Finland; Auli Toom, University of Helsinki, Finland; Ali Leijen, University of Tartu, Estonia; Juan-Jose Mena Marcos, University of Salamanca, Spain; Dubravka Knezic, University of Utrecht, Netherlands; Raili Allas, University of Tartu, Estonia; Mikko Tiilikainen, University of Turku, Finland; Lauri Heikonen, University of Helsinki, Finland; Paulien Meijer, University of Nijmegen, Netherlands; Margus Pedaste, University of Tartu, Estonia;

Action-oriented knowledge (AOK) has been found as a core capability of teacherís professional work (Fenstermacher, 1994; Tillema, 2006), and necessary for student teachers to learn during teacher education. There exists evidence that versatile action-oriented knowledge is related to teacherís multiple ways of acting in instructional and professional situations, and that student teachers experience learning of action-oriented knowledge in the context of teaching practice as highly relevant during their studies (Paassen et al., 2011). Still, quite little is known about the student teacher learning of action-oriented knowledge during teacher education. This study investigates the triggers in the practice of teaching, various qualities of action-oriented knowledge and the relations between the triggers and the related action-oriented knowledge. Large video and stimulated recall interview data were collected from 92 student teachers in four different European teacher education contexts with the procedure of guided reflection (Toom et al, 2014). The video data and STR data were content analyzed by using the theory-based approach. The triggering incidents as defined by student teachers focused on the didactical relation, pedagogical relation and content relation. They explicated descriptive, inferential, and justified action-oriented knowledge. Incidents related to pedagogical and didactical relation both triggered descriptive and justified AOK. Our results imply that student teachers should be provided with the systematic possibilities to learn action-oriented knowledge from the practice of teaching, and thus, increase these professional capabilities throughout the studies.

Gender and gender role differences in student teachersí commitment to teaching

Mixed-method research,Pre-service teacher education,Attitudes and beliefs,Values education,Higher education,Motivation and emotion

Ikupa Moses, ICLON - Leiden University, Netherlands; Wilfried Admiraal, Leiden University, Netherlands;

This empirical study examined the relationship between student teachersí gender roles and commitment to teaching. We also examined the gender difference in commitment to teaching. We used a questionnaire with commitment scales to measure commitment while in order to determine student teachersí gender roles we used the Bem Sex Role Inventory (BSRI). BSRI is an inventory designed to measure psychological androgyny. Participants were the entire cohort final year pre-service secondary teachers from Dar es salaam University College of Education in Tanzania [N=565(355 females, 209 males)]. All data collected were processed and analysed using the SPSS program version 22. We used a two way ANOVA to determine the relationship between variables. In order to obtain student teachersí typology of gender role we performed cluster analyses on the masculine and feminine scale of the BSRI. In findings we emerged with two clusters of student teachers (1) androgynous students with high scored on both masculine and feminine scale and (2) less distinct students with less high score on both masculine and

feminine scale of the BSRI. Both gender and gender role are significantly related to commitment to teaching with females and androgynous student-teachers showing higher scores.

M 21

28 August 2015 17:15 - 18:45

Room Brown_B7

Paper Presentation

Teacher professional development

Teacher professional development and higher education

Keywords: Student learning,Conceptual change,Higher education,Inquiry learning,Knowledge creation,Content analysis,Qualitative methods,Teacher professional development,Pre-service teacher education,Learning in context,Social interaction,Professions and applied sciences

Sig's: SIG 11 - Teaching and Teacher Education,SIG 14 - Learning and Professional Development,SIG 4 - Higher Education

Chairperson: Theodore Chao, The Ohio State University, United States

Re-thinking knowledge creation and communication in higher education: studentsí critical inquiry

Student learning,Conceptual change,Higher education,Inquiry learning,Knowledge creation

Natasa Lackovic, Lancaster University, United Kingdom;

The rise of multimodality approaches (Kress and van Leeuwen, 2001), accelerated by the advent of web 2.0 and digital education have been reshaping long-held views on what constitutes knowledge, literacy and learning. Such approaches argue that meaning making is mediated by more than just one socially constructed communication mode (e.g. language), but involve other ìmodesî such as images, sound, gesturing. Yet, the application, relevance and impact of those approaches within higher education pedagogy are under-researched. Images come in myriads of forms in HE, e.g. graphs, statistical data visualisations in maths and economics, or various depictions of the body in medicine. However, how digital photography supports student understanding across disciplines (other than the arts and media studies) remains a vague area, in spite of digital image proliferation (e.g. Google Images, Instagram, Pinterest). This paper builds on a longitudinal study done with two cohorts of MA students in educational psychology, positioning the students as ìartefact creatorsî and focusing on depictive digital images. The paper presents a pedagogical model which connects a structural semiotics approach, socio-cultural view on inquiry learning and ìphoto elicitationî research methodology. The results suggest that digital multimodal artefacts with depictive photographs within this model have a significant role

in: bringing studentsí prior knowledge into the learning cycle, linking ìeverydayî and ìscientificî concepts in Vygotskian terms and supporting students in developing creative, inquirying minds and multiple perspectives on concepts. Implications for teaching and learning with multimodal artefacts across disciplines, both face-to-face and in distance learning are considered and invited from the audience.

Development of lesson planning during teacher education at University ñ a qualitative study

Content analysis,Qualitative methods,Student learning,Teacher professional development,Higher education

Jochen Werner, University of Oldenburg, Germany; Stephan Wernke, Universitat Oldenburg, Germany; Klaus Zierer, University Oldenburg, Germany;

Abstract Lesson planning is an important component for being a teacher as well as for teacher training at universities (Danielson, 2007). Research evidence indicates that lesson/teaching quality is closely related to lesson planning (ibid.). However, lesson planning is a difficult and complex task. This poses a considerable challenge not only for inexperienced teachers, but also for proficient teachers whose lesson planning often resemble superficial timetables (Haas, 1998). Little is known, however, as to what extent teaching training enhances lesson planning. The central objective of this research project is to find out to what extent teacher training contributes to effective lesson planning. In particular, we want to find how the teaching content influences studentsí ability to plan their lessons. Lesson planning activities within the teacher training at the University of Oldenburg are explored during two different stages of studentsí education: during a preparation course for conducting a school internship and after the first internship at school.

Student teachersí identity development viewed through tensions they experience

Qualitative methods,Pre-service teacher education,Teacher professional development,Higher education,Learning in context

Tiina Anspal, University of Tartu/Archimedes Foundation, Estonia; Ali Leijen, University of Tartu, Estonia; Erika Lofstrom, University of Helsinki, Finland;

Teacher educators need to pay attention to student teachersí identity development process to make sure they leave the programme with a good knowledge, adequate understanding of the teachersí job and responsibilities, but also confidence and skills to create learning environments that facilitate pupilsí learning. Previous research shows that paying attention to professional identity development of the teachers is crucial. This paper describes a 2-year longitudinal study focusing on examining student teachersí emerging teacher identity within three different types of curricula in one university setting in Estonia. The main differences, in addition to duration and the level of integration, include the amount and structure of the pedagogical studies and teaching practice. The data was collected first time at the beginning of the masters programme and second time at the end of the programme, using semi-structured interviews. Data analysis was based on thematic analysis. Both interviews focused on exploring the aspects of teacher identity and it was

revealed that student teachers did that through tensions they experienced. The analysis shows four different types of tensions that were connected with the professional role expectations. The results suggest that pedagogical practice brings out tensions. Student teachers without practice experience mentioned less tensions and had difficulties describing themselves as teachers. Differences between the student teachers from different types of curricula are discussed in the paper. The research adds to the knowledge of how different teacher education programmes contribute to student teachersí professional identity development, enabling one to make knowledge-based decisions in programme development.

Linking research with teaching: Teacher educatorsí perspectives

Qualitative methods,Teacher professional development,Social interaction,Professions and applied sciences,Higher education

Yang Min, The Hong Kong Institute of Education, Hong Kong; Eric, Chi Cheung Cheng, The Hong Kong Institute of Education, Hong Kong; Bick Har Lam, The Hong Kong Institute of Education, Hong Kong; Zi Yan, The Hong Kong Institute of Education, Hong Kong;

How do teacher educators make meaning of the research-teaching relationship through their experiences of knowledge creation and knowledge transfer? This paper explores the key research question through a critical analysis of narratives elicited from three teacher educators. Using a purposive sample that includes one pre-tenure and two tenured academics in a department of teacher education, the paper draws the three teacher educatorsí narratives from interviews and a knowledge transfer seminar to explore their experiences and perspectives associated with the key research question. The narratives centre on the three academicsí experiences of translating their research into teaching programmes or resources for student teachers as well as school teachers and leaders. The provision of such teaching programmes and resources through collaboration and dialogues with these stakeholders, in turn, offers new research opportunities that assisted in the expansive development of the research agendas and scholarly outputs of these teacher educators. What seemed crucial to the sustainable development of their research agendas and outputs were their intentions and initiatives to engage their identified key stakeholders in continuous participatory knowledge creation and transfer through different means. Inherent opportunities and tensions in building a positive research-teaching relationship within the institutional and local educational context (e.g. institutional guidelines on teaching and research performance; school reform policies and practices) - and the academic climate internationally - were also explored.

M 22

28 August 2015 17:15 - 18:45

Room Blue1_C1

Paper Presentation

Technology-enhanced learning

Technology-enhanced learning

Keywords: Experimental studies,Educational technology,Argumentation,Conceptual change,Reasoning,Self-regulation,Quantitative methods,Cognitive skills,Mathematics,Secondary education,Game-based learning,Science education,Computer-assisted learning,Inquiry learning,Mixed-method research,Qualitative methods,Special education,Technology

Sig's: SIG 15 - Special Educational Needs,SIG 3 - Conceptual Change,SIG 7 - Learning and Instruction with Computers

Chairperson: Sui Lin Goei, Windesheim University of Applied Sciences, Netherlands

Writing with C-SAW: effects of built-in self-regulatory devices during argumentative writing

Experimental studies,Educational technology,Argumentation,Conceptual change,Reasoning,Self-regulation

Kalliopi Benetos, University of Geneva, Switzerland;

This quasi-experimental study investigated the effects of writing with C-SAW, an online computer-supported authoring software embodying design principles derived from theories on written argumentation, self-regulation and conceptual change and feedback from practitioners and users in a design-based research approach. Designed as a support for novices of argumentative writing, C-SAW is intended as an additional support in instructional designs using argumentative writing for learning. Testing looked at the process, product and lasting effects of writing argumentative texts, with or without built-in self-regulatory devices through an inter- and intra-subject quasi-experimental design. Preliminary results show that C SAW may have significant mediating effects on reasoning, epistemological beliefs and conceptual understanding with more lasting effects on the latter two.

The impact of linking multiple representations in an algebra simulation game

Quantitative methods,Educational technology,Cognitive skills,Mathematics,Secondary education,Game-based learning

Denise Sutter Widmer, University of Geneva, Switzerland; Mireille Betrancourt, University of Geneva, Switzerland;

Translating word problems into equations is one major difficulty that middle school students face when beginning with algebra. In order to support students in learning this translation, an algebra simulation game was designed in which a concrete representation of a word problem was provided. Two versions of the game were compared to a control condition (no instruction): In the Visualize condition, the relation between the concrete representation and the equation was made explicit while in the Check condition, the learners could verify the equation without explicitly linking it with the concrete representation. Results show that students who played the game were

significantly better at translating a problem into an equation in the post-test than students in the control group. However, there was no difference between the two game conditions in terms of solving performance. Further analyses on studentsí behavior in the game are in progress in order to inform their use of the visualization and checking functionalities.

Information resources that students prefer in a computer-supported inquiry learning environment

Educational technology,Science education,Secondary education,Computer-assisted learning,Inquiry learning

Nikoletta Xenofontos, University of Cyprus, Cyprus; Michalis Theocharous, University of Cyprus, Cyprus; Constantinos Manoli, University of Cyprus, Cyprus; Zacharias Zacharia, University of Cyprus, Cyprus;

The aim of the study was to investigate what information resources students prefer in order to create learning artifacts in the context of a computer-supported inquiry learning environment. For that purpose, eighteen eleventh graders completed the ìDesign of a CO2-friendly houseî mission in the SCY-Lab platform. The students divided in groups of three and collected information from several types of information resources in order to create a several number of artifacts. During the mission, screen captured data were taken and nine students were interviewed. Overall, the students preferred most the videos and websites with short text, pictures and animations. They also found simulation of the learning environment very helpful for the identification of the variables of the phenomenon. In contrast, they did not spend enough time to read information resources with long text, despite the fact that they had detailed and articulated information. Surprisingly, after the completion of several learning artifacts, all participants tended to revisit these artifacts and use them as information resources, rather than move back to the original resources. The results of the study suggest that students need information resources that enable them to orient themselves with the science content and provide them with evidence needed for the completion of the learning task.

Bridging the digital divide: The ENTELIS Project

Mixed-method research,Qualitative methods,Educational technology,Special education,Technology,Computer-assisted learning

Katerina Mavrou, European University Cyprus, Cyprus; Maria Meletiou-Mavrotheris, European University Cyprus, Cyprus; Christos Tiniakos, European University Cyprus, Cyprus;

This submission aims to present part of the EU funded ENTELIS (European Network for Technology Enhanced Learning in an Inclusive Society), which aims to address issues of reducing the digital divide, especially for people with disabilities of all ages, and to increase participation and social inclusion. ENTELIS, is a KA3 ICT Multilateral Network, under which networking and research activities are taking place. This paper will present the main activities and outcomes of the research work package of the project (WP3). Based on extensive review of relevant literature, consortium partners involved in WP3 have developed a comprehensive

framework to guide the collection, description and assessment of experiences in ICT and ICT-AT education and skills development. They have also conducted research to identify the conceptions and beliefs of end-users, trainers, and service/technology providers and professionals, on the multifaceted relation between ICT / ICT-AT (Information Communication Technology ñ Assistive Technology) and learning of technology. Data collection involved the development and administration of three semi-structured interview protocols, one for each group of participants, in five different European countries. Results have been compiled to develop a State-of-Art Report on ICT and ICT-AT education and learning, highlighting the main trends, as well the main present barriers, emergent and future needs in terms of analysis, acquisition and reinforcing of digital competences bridging the worlds of education and work.

M 23

28 August 2015 17:15 - 18:45

Room Blue2_D2

Paper Presentation

Writing

Writing and comprehension of text/graphics

Keywords: Meta-analysis,Instructional design,Comprehension of text and graphics,Interdisciplinary,Multimedia learning,Case studies,Educational technology,Peer interaction,Science education,Writing/Literacy,Computer-supported collaborative learning,Experimental studies,Mixed-method research,Teaching/instruction,Secondary education,Communities of practice,Qualitative methods,Primary education,Cooperative/collaborative learning

Sig's: SIG 12 - Writing,SIG 2 - Comprehension of Text and Graphics,SIG 7 - Learning and Instruction with Computers

Chairperson: Victoria Johansson, Lund University, Sweden

Signaling Text-Picture Relations: A Comprehensive Meta-Analytic Review

Meta-analysis,Instructional design,Comprehension of text and graphics,Interdisciplinary,Multimedia learning

Juliane Richter, Leibniz-Institut fur Wissensmedien, Germany; Katharina Scheiter, Knowledge Media Research Center, Germany;

The signaling principle is one of the well-known multimedia design principles defined by Mayer (2009). It recommends highlighting relevant aspects of a multimedia message by means of signals (such as color-coding or deictic references) in order to foster meaningful learning from

multimedia. The present contribution aims at determining the effectiveness of signals that highlight correspondences between verbal and pictorial information of a multimedia message for learning as well as possible boundary conditions for it by means of a meta-analytic review. To this end, 970 potentially relevant articles were derived from searching databases and conference proceedings, requesting relevant studies via research organizationsí mailing lists, mailing to first authors-, and scanning the reference lists of relevant articles. After rating the studies based on inclusion criteria and correcting for multiple outcome measures and group comparisons as well as outliers, 21 studies were included into the meta-analysis yielding 47 pair-wise comparisons with N = 2,500 participants. Study features such as learnersí prior knowledge, sample characteristics, pacing of the presentation and the verbal and pictorial formats within the materials were coded for each of the studies. Overall a positive small to medium effect size (r = .15, 95% CI [.09, .20]) in favor of signaled multimedia learning material was found for transfer and comprehension performance. The prior knowledge of the learner and the pacing of the presentation moderated this effect significantly. Thus, these findings support the signaling principle and stress that signals particularly support low prior knowledge learners learning from multiple external representations.

Together and Separately: Collaborative Writing in Science and Technology Teacher Education

Case studies,Educational technology,Peer interaction,Science education,Writing/Literacy,Computer-supported collaborative learning

Miri Barak, Technion - Israel Institute of Technology, Israel; Ariella Levenberg, Technion - Israel Institute of Technology, Israel;

Writing in shared cloud documents raises questions regarding collaboration among writers in small groups and the process of co-construction of knowledge (CCK). Addressing a gap in research, this study is set to characterize collaboration levels in simultaneous writing processes (online and in-class) and to understand the way knowledge is co-constructed. To this end, a multiple-case-study, in which every writing group represented a case, was administered. The study's' participants were 51 science and engineering education students divided into 12 small groups. Twenty eight shared documents, 18 semi-structured interviews, and 14 classroom observations where analyzed. Findings indicated three levels of online simultaneous collaborative writing (SCW): 1. Interwovenñ writing about the same topic in the same paragraph; 2. Integratedñwriting about the same topic, but in different paragraphs; 3. Parallelñwriting about different (but related) topics in different paragraphs. Findings indicated that the writing episodes were mostly parallel in nature - a lower SCW level. They also indicated low level of CCK phases, including: sharing and comparing information, discovery of dissonance and inconsistency, and negotiation of meaning. Our results show that the capabilities of cloud applications were not fully exploited since high levels of knowledge co-construction were not fully expressed.

The impact of explicit metalinguistic instruction on writing proficiency in low-attaining writers

Experimental studies,Mixed-method research,Teaching/instruction,Secondary education,Communities of practice

Debra Myhill, University of Exeter, United Kingdom; Susan Jones, University of Exeter, United Kingdom;

Whilst historically there has been a widespread consensus that teaching grammar has no impact on studentsí attainment in writing, recent research suggests that where the grammar is meaningfully embedded within the teaching of writing, significant improvements in writing can be secured. Such approaches draw learnersí attention to language as an artefact and foster their metalinguistic understanding of how to shape written text. However, our recent study (Myhill et al 2012) which found a statistically significant positive effect of such an approach, also found that the approach appeared to benefit higher-attaining writers more than lower-attaining writers. This study set out to investigate specifically whether an embedded approach to teaching grammar in the context of writing might support struggling writers. A quasi-experimental design was adopted, repeating the principles of the parent study but with the intervention adapted to meet the identified writing needs of struggling writers. 315 low-attaining students, aged 12-13, in fourteen classes formed the sample. The statistical analysis indicated a positive effect for the intervention group (p..05), though a high attrition rate of 23% also points to wider social issues which contribute to these studentsí lower-attainment in writing. The study demonstrates that explicit metalinguistic attention to grammar within the teaching of writing can support learners in developing their writing, and highlights that pedagogical choices need to be well-matched to writersí needs. These results point to the beneficial impact of explicit metalinguistic instruction and, when taken in conjunction with the earlier study, contribute to the weight of evidence for this benefit.

Grammatical Reasoning: Possibilities and Limitations

Qualitative methods,Writing/Literacy,Primary education,Secondary education,Cooperative/collaborative learning

Susan Jones, University of Exeter, United Kingdom; Debra Myhill, University of Exeter, United Kingdom;

The re-introduction of grammar into the National Curriculum in the UK is driven by differing motivations: on the one hand the perceived need to raise stands and eradicate error, and typified by a focus on grammatical forms; in contrast to a contextualised approach, whereby the grammar is embedded within the writing classroom and typified by a focus on how grammar shapes meaning. Our earlier research has shown a statistically significant positive effect for such an approach; (submitting author 2012) however, this effect was shown to be mediated by teacher subject knowledge and teacher beliefs about the value of grammar knowledge for young writers (submitting team 2012). This paper will explore studentsí ëgrammatical reasoningí: examples of students 'working out' a grammatical concept or label in order to understand or explain it. The data is drawn from the first year of a three year ESRC (Economic and Social Research Council) funded project exploring how metalinguistic understanding in writing develops between ages 9 and 14. Through reference to a single code generated by the inductive analysis of student

interviews it will discuss the nature of ëgrammatical reasoningí exploring both moments of clarity and moments where reasoning is misconceived showing how these echo implicit and explicit messages from the classroom. These examples of students ëthinking aloudí their developing grammar awareness will be discussed in the light of conflicting agendas around classroom practices

M 24

28 August 2015 17:15 - 18:45

Room Cyan_F2

Paper Presentation

Assessment methods and tools

Assessment methods and tools

Keywords: Quantitative methods,Assessment methods and tools,Primary education,Motivation and emotion,Psychometrics,Cognitive skills,Secondary education,Competencies,Social aspects of learning,Case studies,Teacher professional development,Self-regulation,Higher education

Sig's: SIG 1 - Assessment and Evaluation,SIG 8 - Motivation and Emotion

Chairperson: Erno Lehtinen, University of Turku, Finland

Studentsí situation-specific and overall school engagement in lower secondary school

Quantitative methods,Assessment methods and tools,Primary education,Motivation and emotion

Sanni Poysa, University of Jyvaskyla, Finland; Kati Vasalampi, University of Jyvaskyla, Finland; Joona Muotka, University of Jyvaskyla, Finland; Marja-Kristiina Lerkkanen, University of Jyvaskyla, Finland; Anna-Maija Poikkeus, University of Jyvaskyla, Finland; Jari-Erik Nurmi, University of Jyvaskyla, Finland;

The aim of the present study was to examine to what extent the situation-specific engagement is associated with studentsí overall school engagement and to what extent the engagement is dependent on school subject in secondary school. Assessments of the situation-specific engagement were made with repetitive online mobile-ratings (InSitu), and for the overall school engagement with Student Engagement Instrument (SEI). Participants were 1,335 seventh grade Finnish students (53% boys, age 13-14 years). The results of EFA showed theoretically meaningful five-factor structure for InSitu online-ratings. Moreover, the results of the univariate ANOVA indicated that there was variation in studentsí assessments depending the school subject. Correlations between situation-specific engagement and overall school engagement showed moderate to high associations suggesting that high future aspirations were associated with studentsí situation-specific behavioral engagement, competence experiences and affective

engagement. Altogether the results of this study indicate that InSitu assessment captures well studentsí engagement and motivation experiences in daily basis. KEYWORDS: situation-specific engagement, school engagement, secondary school

Psychometric characteristics of the Executive Functioning Scale for Families (EFS-F)

Psychometrics,Assessment methods and tools,Cognitive skills,Primary education,Secondary education

Trinidad Garcia, University of Oviedo, Spain; David Alvarez-Garcia, Oviedo University, Spain; Alejandra Dobarro, University of Oviedo, Spain; Marisol Cueli, University of Oviedo, Spain; Natalia Suarez, University of Oviedo, Spain;

This study was aimed at analyzing the psychometric characteristics of a new behavior rating scale, designed to evaluate different executive functioning components in children and adolescents: the Executive Functioning Scale for Families (EFS-F). This scale consists of 27 Likert-type items. Informants (father, mother, or legal tutor) are asked to report the frequency with which children and adolescents show a series of problematic behaviors, related to possible impairments in executive functioning. For its validation, the scale was administered to the families of 1019 third to tenth grade students (7 to 18 years, M = 11.85, SD = 2.06) from Asturias (Spain). Confirmatory factorial analyses showed that the model that best fits the data is the composed by nine factors: Impulsivity Control, Activity Regulation, Emotional Control, Focus, Concentration, Planning, Functional Memory, Organization, and Flexibility [?2/df=3.65, GFI=.93, CFI=.93, RMSEA= .05 (.05-.05)]. Factorial loads of each item in its factor were high. Internal consistency was high for the scale (Cronbach ? = .94), and moderate for its factors. The proportion of variance in the item explained by the latent variable (R2) ranged between 24% and 57%. Theoretical implications: these results support the adequacy of the proposed theoretical model, comprised of nine factors. Practical implication: EFS-F scale showed good psychometric properties, which suggests its usefulness in the assessment of executive functions, based on the analysis of the behavior in natural contexts. This scale would suppose a complement to other traditionally used neuropsychological measures, based on performance, by increasing the ecological validity of this evaluation.

Assessment for Learning and studentsí motivation and fear: Self-Determination Theory perspective

Quantitative methods,Assessment methods and tools,Competencies,Social aspects of learning,Secondary education,Motivation and emotion

Jolien Maes, Ghent University, Belgium; Christa Krijgsman, Utrecht University/ Ghent University, Netherlands; Greet Cardon, Ghent University, Belgium; Lars Borghouts, Fontys University of applied Sciences, Netherlands; Leen Haerens, Ghent University, Belgium;

Background. In order to promote transfer of learning, it is crucial that young people have positive learning experiences at school (Haerens et al., 2010). Specifically for physical education (PE), studies revealed that studentsí experiences in PE relate to their intention of being

physically active in leisure time. While grading in PE often induces negative motivational outcomes, Assessment for Learning (AfL; which provides students with insights to their learning process so they can build towards higher standards) might have a positive impact on studentsí motivational experiences. This study was grounded in Self-Determination Theory. Aim. The present study investigated whether the use of AfL strategies have positive impacts upon studentsí perceived competence, quality of motivation and fear. Methods. Thirty-eight PE teachers with each one group of students (N=724, mean age 14.7 ± 0.94, range 12-18 years) from Flanders (Belgium) filled out validated questionnaires to measure the extent of applied AfL, studentsí perceived competence, quality of motivation and level of fear after a PE lesson. Given the nested structure of the data (students within teachers), multilevel regression analyses were deployed. Results. Results indicated that the more AfL is applied, the more competence satisfaction and autonomous motivation students will report. No significant relationships were found between AfL and controlled motivation, amotivation and level of fear. Conclusions. Implementing AfL-strategies induces more competence satisfaction and autonomous motivation. Future research is needed to develop strategies to avoid competence frustration, controlled motivation, amotivation and fear in a PE lesson. Practical implications for education will be discussed.

Effective feedback: A study to evaluate written comments as a form of feedback

Case studies,Assessment methods and tools,Teacher professional development,Self-regulation,Higher education

Jorik G. Arts, Fontys University of Applied Sciences, Netherlands; Mieke Jaspers, Fontys University of applied sciences, Netherlands; Desiree Joosten-ten Brinke, Fontys university of applied science, Netherlands;

In Higher Education, much of a lecturerís time is spent on supplying students with written comments as a form of feedback on assignments. Although it is clear that students use these comments to make adjustments to their assignments, it is doubtful that these comments create a learning effect. This may indicate that the way feedback is supplied lacks information to improve future performance. In this study, written feedback has been analysed according depth, type (feed up, feedback or feed forward) and level (task, process, self-regulation or person).. The perception of students on the quality of written feedback in relation to their learning behaviour has taken into account. Results show unawareness of lecturers of different kinds of feedback.

N 1

29 August 2015 08:45 - 10:15

Room Green_A4

Invited SIG

Assessment methods and tools

Implementing Assessment for Learning: Collaboration, Culture and the Regulation of Learning

Keywords: Action research,Assessment methods and tools,Communities of practice,Culture,Self-regulation,Teacher professional development

Sig's: SIG 1 - Assessment and Evaluation

Chairperson: Linda Allal, University of Geneva, Switzerland

Organiser: Linda Allal, University of Geneva, Switzerland

Discussant: Dany Laveault, University of Ottawa, Canada

Although there is widespread recognition of the value of Assessment for Learning (AfL), many challenges are encountered in the attempts to implement the AfL policies adopted by school systems around the world. This symposium analyses essential conditions for developing high quality, sustainable AfL practices in classrooms and schools. It is based on data from qualitative research conducted in three countries (Norway, Israel, Switzerland), as well as a literature review of studies carried out elsewhere. The papers present findings that support the following conclusions. Although AfL can be mandated by a school system, it can not be implemented by decree. Collaboration among school authorities, principals/head teachers, classroom teachers and researchers is necessary in order to develop shared understandings and practices that constitute the foundations of schools' assessment culture. An assessment culture favourable to AfL implies different values and a different mindset than those prevalent in the testing culture that has been fostered by many top-down models of accountability in education. Collaboration among professionals constitutes moreover a dynamic backdrop for building a culture of collaborative assessment among students, and between teachers and students, in the classroom. A situated perspective on AfL requires practices that link student self-regulation to interactive regulation with the teacher and other students (i.e., co-regulation, socially shared regulation). Several aspects of AfL practice that are likely to have a significant impact on these forms of regulation are analysed.

Cooperative Learning about Assessment

Action research,Assessment methods and tools,Teacher professional development,Workplace learning

Kari Smith, Norwegian University of Science and Technology (NTNU), Norway;

Assessment for learning (AfL) has been embraced by educators internationally and likewise in Norway, and it is salient in the rhetoric of policy-makers and in national steering documents. Yet, in spite of the explicit positive intentions, there seem to be a number of challenges in the process of implementation of AfL in schools. A major obstacle is the increased testing regime practiced at a national level, which presents teachers with the dilemma of to what extent should they teach for the test or spend time on developing self-regulated learning in students

experiencing self-efficacy. The latter for the sake of life-long learning whereas cramming for grades often has a short term learning effect. A second challenge is the isolation some teachers feel in school when practicing AfL due to the fact that it is not integrated in the school culture and equally valued by colleagues and school leadership. There is often little cooperation around AfL. The current paper will present a Norwegian project in which the regional authorities, head teachers from five schools, and the university joined forces in developing understanding and competence in AfL among all participants. Key elements of the project were introducing the participants to research literature on AfL, and involving them in action research conducted jointly with colleagues in their own schools.

Assessment Culture vs. Testing Culture: Impact on Assessment for Learning

Assessment methods and tools,Teacher professional development,Culture,Self-regulation,Communities of practice

Menucha Birenbaum, Tel Aviv University, Israel;

In the current paper I contrast two school cultures ñ assessment culture (AC) and testing culture (TC) ñ and examine their potential to support or inhibit assessment for learning. First, I compare the two cultures with regard to values, beliefs, norms, and mindset; I then discuss the role of school leadership in the emergence of each culture. Further, I compare the internal assessment practices as well as the impact of external accountability tests on AC and TC schools and contrast the schools with regard to an underlying dimension of regulation, addressing its individual and social manifestations at the classroom and the organization levels. I conclude by explaining why AC, as opposed to TC, is conducive for successful implementation of assessment for learning.

Co-construction of Collaborative Practices of Assessment for Learning

Qualitative methods,Assessment methods and tools,Teacher professional development,Peer interaction,Primary education,Cooperative/collaborative learning

Lucie Mottier Lopez, University of Geneva, Switzerland; Fernando Morales Villabona, University of Geneva, Switzerland;

Collaborative assessment, as developed in the classroom (among students and with the teacher), but also in the interactions between professionals (teachers, teacher educators, principals, researchers), aims at promoting the construction of collective knowledge and shared practices of assessment. We consider that collaborative assessment is a fruitful concept for renewing the ìassessment relationshipsî among participants in teaching/learning activities. What kind of questions do teachers ask about collaborative assessment? What kind of collaborative assessment practices do they tend to develop in their classrooms? Our communication will present a collaborative research project involving six primary school teachers and two researchers working in the canton of Geneva. The project was aimed at facilitating attempts to establish collaborative assessment practices in the classroom of each teacher. The results will show how the idea of collaborative assessment was constructed during the collective sessions, and the main values and

heuristics that emerged among the participants. The goal of the sessions was to co-construct a shared meaning of collaborative assessment aimed at promoting assessment for learning and assessment as learning. The communication will describe teachersí conceptions about collaborative assessment for learning, the kinds of practices they developed and will discuss some challenges for implementing collaborative assessment, in the classroom and in terms of teachersí professional development.

How Assessment for Learning promotes Self-regulation, Co-regulation and Shared Regulation

Assessment methods and tools,Teaching/instruction,Metacognition,Self-regulation,Social aspects of learning

Ernesto Panadero, Universidad Autonoma de Madrid, Spain; Anders Jonsson, Kristianstad University, Sweden; Jan-Willem Strijbos, Ludwig-Maximilians-Universitat (LMU), Germany;

The relationship between Assessment for Learning (AfL) and the formative assessment component in self-regulated learning (SRL) has been long debated, but direct empirical evidence about this relationship is scarce. Actually, the AfL focus on feedback and student involvement aligns with SRL, and appears to be the main reason for many researchers to conduct research on formative assessment. This paper provides a conceptual literature review (non-exhaustive) to explore this relationship in more detail. We will review theoretical and empirical evidence on the ways AfL practices may promote self-, co- and shared regulation. At the individual level, AfL can help each student to become a better self-regulator. At the interaction level, AfL can be used to promote co-regulation of learning through a teacher or a peer adopting the role of a more knowledgeable other. At the collaborative level, AfL practices can achieve socially shared regulation when a group of students is jointly engaged in solving a problem.

N 2

29 August 2015 08:45 - 10:15

Room Green_A7

Invited SIG

Cognitive development

Neurocognitive effects of training executive functions

Keywords: Biology ,Cognitive development,Cognitive skills,Neuroscience,Special education

Sig's: SIG 22 - Neuroscience and Education

Chairperson: Roland H. Grabner, University of Graz, Austria

Organiser: Bert De Smedt, University of Leuven, Belgium

Discussant: Nienke van Atteveldt, VU University Amsterdam, Netherlands

The focus of this SIG-Invited Symposium is on the training of executive functions. These functions are cognitive control functions that are needed during learning and allow us to control and regulate our behaviour. It has been shown that they depend on a neural circuit in which the prefrontal cortex, the part of the brain that shows the longest maturation, plays a prominent role. As a result, these functions display a long development over childhood and adolescence and various attempts have been made to design interventions to stimulate these functions. The symposium consists of four empirical studies that cover the training of these executive functions. Both behavioral and neuroscientific methods are used to examine the effects of these interventions. Research questions that are addressed include: (1) Do the effects of these interventions generalize (transfer) to other abilities? (2) Are interventions training multiple executive functions more effective than those training one executive function (3) What are the effects of neurofeedback training on executive functions? (4) What is the effect of feedback on brain activity during learning? All empirical papers will address the theoretical and educational implications of their findings and discuss the relevance of training executive function for the field of learning and instruction.

Improving executive functioning by working memory training

Quantitative methods,Neuroscience,Cognitive development,Interdisciplinary,Primary education,Computer-assisted learning

Walter Perrig, University of Bern, Switzerland;

The question on how cognitive performance can be improved through training is a key issue in basic research as well as in practice. The main part of training research and training programs across a large variety of domains focuses either on exercising abilities directly or on the development of strategies to build up specific expertise and skills. A restriction of this training approach is seen in its domain-specific effects with little transfer to non-trained performances. In recent years a number of studies showed limited but converging evidence for near transfer effects of process-based complex working-memory (WM) training on other non-trained WM tasks and far transfer on higher-level cognition like episodic memory, reasoning, and academic abilities. Because of replication failures and inconsistent results, some authors conclude that this research approach has failed. The contribution at hand presents arguments and evidence revealing that this conclusion is premature. It is demonstrated that the complex nature of WM as a capacity-limited multi-component system, holding and manipulating information, asks for intensified effort in analyses at both the conceptual and the task level. WM is involved in all tasks that are related to phenomenological experience, attention, conscious control, reflections, effort, will, and endurance. Therefore a broaden view of WM and a combination of experimental and individual difference approaches in research are needed to unwrap the causal domain-specific and domain-general elements in WM-training in order to achieve efficient training and reliable transfer effects.

Quality and development of executive functioning in young children: The role of the context

Quantitative methods,Neuroscience,Cognitive development,Learning and developmental difficulties,Interdisciplinary,Primary education,Computer-assisted learning

Loren Vandenbroucke, University of Leuven, Belgium; Karine Verschueren, K.U.Leuven, Belgium; Eva Ceulemans, University of Leuven, Belgium; Bert De Smedt, University of Leuven, Belgium; Dieter Baeyens, KU Leuven, Belgium; Kim De Roover, University of Leuven, Belgium;

Development of executive functions (EF) shows a clear link with brain maturation. The impact of contextual factors on EF development, however, remains understudied. Therefore, we set out to examine the organization and development of EF-subcomponents in relation to the family and school environment. A sample of 107 typically developing children were tested before (T1) and after (T2) their transition to elementary school. All children were tested with a battery measuring different subcomponents of working memory (phonological loop, visuo-spatial sketchpad, central executive), inhibition (selective attention, interference control, response inhibition, delay of gratification) and cognitive flexibility (fluency, response-shifting, attention-shifting). Parents and teachers provided information on family and school variables by completing questionnaires. Latent Class Analysis indicated that there are two distinct EF-profiles at T1, representing a high- and a low-EF group. In the high-EF group we found higher socio-economic status, less mothers that smoked during pregnancy and less single-parent and reconstituted families than in the low-EF group. Moreover, mothers of children in the high-EF group scored higher on the authoritative parenting style. T2 data are currently available for 90 children. Development of EF-subcomponents between T1 and T2, as well as the association with family and school context factors will be analyzed and presented at the conference meeting. Already at T1 it becomes clear that contextual factors are strongly linked to the quality of EF. The current study design will help determine which (malleable) context factors are associated with EF development and, as such, should be taken into account in EF trainings.

EEG based neurofeedback training on memory and executive functions in post-stroke victims

Quantitative methods,Neuroscience,Learning and developmental difficulties,Interdisciplinary,Out-of-school learning,Computer-assisted learning

Guilherme M. de O. Wood, University of Graz, Austria; Daniela Hofer, University of Graz, Austria; Matthias Witte, University of Graz, Austria; Johanna Louise Reichert, University of Graz, Austria; Peter Grieshofer, University of Graz, Austria; Christa Neuper, University of Graz, Austria; Silvia Erika Kober, University of Graz, Austria;

Using EEG based neurofeedback (NF), the electrical activity of the brain is modulated directly and so are cognitive functions. NF may foster recovery of the brain following stroke. We investigated the ability of stroke patients to control their own brain activity and evaluated specific effects of different NF protocols (SMR/Upper Alpha). Seventeen stroke patients and 40

controls performed NF training. Participants completed tests of cognitive functions before and after training. About 70% of both patients and controls learned to modulate their own brain activity. Stroke patients showed NF training performance comparable to that of controls. Gains in NF performance led to improvements in verbal short- and long-term memory, independent of the used NF protocol. The SMR patient group showed specific improvements in visuo-spatial short-term memory. The Upper Alpha patient group specifically improved their working memory. Controls showed similar cognitive improvements due to NF training. NF training showed no effects on other cognitive functions than memory. Post-stroke victims with memory deficits can benefit from NF training as much as healthy controls. The used NF training protocols (SMR, Upper Alpha) had specific as well as unspecific effects on memory.

A longitudinal analysis of developmental change in neural activity for feedback learning

Quantitative methods,Neuroscience,Cognitive development,Interdisciplinary,Secondary education,Computer-assisted learning

Sabine Peters, Universiteit Leiden, Netherlands; Anna Van Duijvenvoorde, University of Leiden, Netherlands; Eveline Crone, University of Leiden, Netherlands;

Learning from feedback is an important ability that develops rapidly in childhood and early adolescence, and has been associated with the development of the fronto-parietal and frontal-striatal learning network. This study tested developmental changes in brain activity during feedback learning using a longitudinal design in which 211 participants between ages 8 and 27 were tested twice across 2 years. Participants performed a learning task where stimuli had to be sorted in one of three locations without knowing the correct rules beforehand. Participants used negative and positive feedback to detect the correct rules (learning phase), and applied these rules in a subsequent application phase. Dorsolateral prefrontal cortex (DLPFC), pre-supplementary motor area (pre-SMA)/anterior cingulate cortex (ACC), superior parietal cortex (SPC) and caudate were recruited more during learning than application, and more during learning from negative than positive feedback. Mixed linear models were used to test linear vs. nonlinear patterns of neurodevelopmental change. In addition, neural activity was used to predict future school performance, highlighting the importance of these findings for school settings

N 3

29 August 2015 08:45 - 10:15

Room Brown_B1

Invited SIG

Early childhood education

Self-regulation in early childhood:conceptualization, assessment,and contextual classroom predictors

Keywords: Cognitive development,Developmental processes,Early childhood education,Learning in context,Self-regulation,Social sciences

Sig's: SIG 5 - Learning and Development in Early Childhood

Chairperson: Paul Leseman, Utrecht University, Netherlands

Organiser: Joana Cadima, University of Porto, Portugal

Organiser: Pauline Slot, Utrecht University, Netherlands

Discussant: Frederick J. Morrison, University of Michigan, United States

Self-regulation has been increasingly recognized as crucial for later school success. A growing literature indicates that aspects of self-regulation and related constructs, including effortful control, executive functions, behavioral regulation, and emotion-related regulation, are associated with learning and academic competence (Blair & Razza, 2007; McClelland et al., 2007). However, there is still a lack of conceptual clarity. In addition, given the potential role of self-regulation for early school success, it seems critical to understand early contextual influences on self-regulation, particularly in cultural contexts where research is still scarce. This symposium brings together four studies that examine young children's self-regulation in four countries and the role of classroom process quality on its development. Study 1 examines self-regulation in a naturalistic play setting in Dutch pre-school classrooms. Study 2 examines the factor structure of executive function skills in Chilean classrooms. Study 3 explores the associations between teacher-child interactions and children's self-regulation, including both physiological and behavioral aspects in the United Arab Emirates. Finally, study 4 investigates the influences of individual-level and group-level classroom social processes on self-regulation skills in Portugal. Overall, the studies will provide insight into the conceptualization and measurement of self-regulation in different countries and the ways in which classroom processes shape self-regulation in early childhood.

Self-regulation in the pre-school classroom: The role of classroom quality and play

Assessment methods and tools, Developmental processes,Self-regulation,Early childhood education

Pauline Slot, Utrecht University, Netherlands; Hanna Mulder, Utrecht University, Netherlands; Paul Leseman, Utrecht University, Netherlands;

The preschool period is marked by rapid growth of childrenís self-regulation and related executive functions. Self-regulation is considered an important aspect of school readiness and has been found to be related to academic and social-emotional outcomes in later childhood. Previous research has shown positive effects of classroom quality and play-based curricula on childrenís self-regulation. In the current study, three-year-oldsí cognitive and emotional self-regulation was observed in a naturalistic play setting, using a newly developed rating scale, the Self-Regulation in Play Scale (SRPS). While controlling for childrenís executive functions as

assessed with neuropsychological tests, we studied the influence of the classroom context on childrenís ëstateí self-regulation as observed during play, focusing on general classroom quality, on the one hand, and the specific quality of pretend play on the other hand. Classroom quality was evaluated using the Classroom Assessment Scoring system Toddler. The quality of pretend play was assessed with the Smilansky Scale for Evaluation of Dramatic and Sociodramatic Play. Results show no effects of general classroom quality on childrenís observed self-regulation, whereas the quality of pretend play, in particular the degree of symbolization and role enactment, was strongly associated with observed cognitive self-regulation and, to a lesser extent, with observed emotional self-regulation. Possible implications of the findings for early childhood programs are discussed.

The development of executive functions in Chilean preschool children

Quantitative methods,Assessment methods and tools,Developmental processes,Self-regulation,Early childhood education

Hirokazu Yoshikawa, New York University, United States; Diana Leyva, Davidson College, United States; Mary Catherine Arbour, Harvard University, United States; Christina Weiland, University of Michigan, United States; Ernesto Trevino, Universidad Diego Portales, Chile; Susana Mendive, Pontificia Universidad Catolica de Chile, Chile; Catherine Snow, Harvard University, United States; M. Clara Barata, University of Coimbra, Portugal;

Over the past decade, developmental researchers have increasingly focused on the role of executive functions (EF) in the regulation of behavioral, social and cognitive competence in children. This interest derived from the understanding that EF skills show significant predictive power of later academic achievement (Duncan et al., 2007). Moreover, there is evidence that EF skills have strong neurological underpinnings, at least during the early years (Posner & Rothbart, 2007; Blair, 2002). However, most of the EF research is restricted to samples from English-speaking high-income countries, leaving doubts about the universality of EF skills and the relationship to other developmental and contextual factors. In our presentation, we will describe the skill level, and the associations of EF with emergent academic skills and quality of teacher-child interactions in a sample of 1,868 poor urban Chilean preschoolers in 95 classrooms. Our results indicated that in Chile: 1) children in our sample were lagging in numeracy and vocabulary by approximately four months, on average, compared to their Latin-American and Spanish-speaking North-American peers; 2) higher levels of EF at the beginning of preschool were statistically significant predictors of higher emergent mathematics skills, but not of emergent literacy skills at the end of preschool (Barata, 2011); 3) quality of teacher-child interactions, particularly instructional support, was a statistically significant positive predictor of gains in EF from beginning to end of preschool (Leyva et al., in press). We will discuss implications of this knowledge for developmental science and preschool practice and policy in Chile and Latin America.

Individual differences in childrenís self-regulation in response to classroom activities

Quantitative methods,Assessment methods and tools,Developmental processes,Self-regulation,Early childhood education

Antje von Suchodoletz, New York University Abu Dhabi, United Arab Emirates; Lydia Barza, Zayed University Abu Dhabi, United Arab Emirates;

There is strong theoretical and empirical evidence that childrenís learning in classrooms is mediated by the nature of their interactions with their teachers (Hamre et al., 2013). However, it remains unclear whether teacher-child interactions differentially affect lower order, more automatic, i.e., physiological, and higher order, more deliberate, i.e., behavioral, processes of self-regulation (Blair & Ursache, 2011). In addition, the cultural appropriateness of commonly used measures of self-regulation has yet to be scrutinized. The present study examined whether measures of self-regulation developed with U.S. samples can validly be used with an international sample to capture relations between teacher-child interactions and childrenís self-regulation (physiological and behavioral aspects). An international sample of 136 children (47% girls; Mage = 64.11 month, SD = 4.93) and their teachers were recruited in 27 classrooms in 6 schools from the United Arab Emirates. Teacher-child interactions were observed using the Classroom Assessment Scoring System (CLASS Pre-K). A test battery measured behavioral aspects of self-regulation while physiological aspects were assessed using salivary and hair cortisol. Results indicate substantial variability in childrenís self-regulation. Moreover, significant positive relations between aspects of teacher-child interactions and higher-order processes of self-regulation were found. The quality and types of teacher-child interactions in the development of self-regulation and implications to enhance childrenís self-regulation skills will be discussed.

Early predictors of self-regulation in young children: Individual-level and group-level processes

Quantitative methods,Assessment methods and tools,Developmental processes,Self-regulation,Early childhood education

Joana Cadima, University of Porto, Portugal; Karine Verschueren, Faculty of Psychology and Educational Sciences, KU Leuven, Belgium; Teresa Leal, University of Porto, Portugal; Carolina Guedes, Faculty of Psychology and Educational Sciences, University of Porto, Porto, Portugal, Portugal;

This study examined classroom interactions and dyadic teacherñchild relationships as predictors of selfñregulation in a socially disadvantaged sample of preschool children (N = 206; 52% boys). In particular, we were interested in determining the influences of individual-level and group-level classroom social processes on self-regulation skills. Childrenís selfñregulation was observed in preschool at the beginning and at the end of the year. At the middle of the preschool year, classroom observations of teacherñchild interactions(group level) were conducted by trained observers and teachers rated the quality of dyadic teacherñchild relationships (individual level). Results from multilevel analyses revealed that teacherñchild closeness predicted improvements in observed selfñregulation skills. Children showed larger gains in selfñregulation when they experienced closer teacherñchild relationships. Moreover, a moderating effect between classroom instructional quality and observed selfñregulation was found, such that children with low initial self-regulation skills benefit the most from classrooms with higher

classroom quality. These findings have implications for understanding the role of classroom social processes on the development of selfñregulation.

N 4

29 August 2015 08:45 - 10:15

Room Brown_B8

Invited SIG

Workplace learning

Learning for, through and at the workplace: From newcomer to professional

Keywords: Lifelong learning,Reflection,Vocational education,Workplace learning

Sig's: SIG 14 - Learning and Professional Development

Chairperson: Regina Mulder, University of Regensburg, Germany

Organiser: Helen Jossberger, University of Regensburg, Germany

Discussant: Monika Nerland, University of Oslo, Norway

Understanding learning for, through and at the workplace is a central endeavour of many researchers in the Sig 14 Learning and Professional Development. Learning is considered a lifelong process of individual development, which leads to improved practice and work. Learning and working are by no means two separate entities; learning influences working and working impacts learning. Through continuous professional learning and active involvement, knowledge and skills develop. But what is needed to promote learning for, through and at the workplace in order to develop from newcomer to professional? In this symposium, the speakers took up the challenge to investigate learning from different angles. Moreover, the second part of the title ëFrom newcomer to professional' is also taken literally by including a junior researcher as well as senior researchers. Starting in vocational education, a study is presented in which the use of technology was investigated to link multiple learning contexts and find ways to increase reflection and support learning. In the second presentation, the quality of a real professional is critically discussed and the ëright' mindset needed to learn is put forward. Then three work-related interventions are introduced with the focus on supporting professional identity, enabling participation in the work community, and promoting agency. In the last presentation, the social network at work and its development is explored. It expands existing research on organisational learning and creativity by analysing creativity in the dynamics of social networks. The four contributions are critically discussed and directions for future research are highlighted.

Using technology to bridge the gap among learning locations

Student learning,Metacognition,Professions and applied sciences,Vocational education,Computer-assisted learning

Elisa Motta, Swiss FederaInstitute for Vocational Education and Training (SFIVET) , Switzerland; Alberto Cattaneo, Swiss Federal Institute for Vocational Education and Training, Switzerland; Jean-Luc Gurtner, University of Fribourg, Switzerland;

In the so-called dual system for Vocational Education and Training (VET), apprentices make very diverse experiences in the different contexts in which their training takes place: The company, the vocational school and ñ in the Swiss VET system ñ the intercompany courses too. Apprentices need to connect these experiences together to build a coherent corpus of knowledge, both theoretical and practical. However, apprentices generally feel important gaps between what is learnt in these various locations. If embedded in appropriate pedagogical scenarios, the use of mobile technologies can help to bridge these gaps by producing and carrying boundary objects that can be re-exploited in different context. All the scenarios presented in this contribution aim at sharing and commenting in class different professional ìtracesî captured from the workplace by apprentices while working, being them in form of pictures, learning journals or recipes: they represent powerful ways to exploit the diversity of experiences made at the workplace and to promote learning across learning locations through reflection, interaction and collaborative problem solving activities.

Mindsets related to learning in becoming a professional learner

Teacher professional development,Attitudes and beliefs,Learning approaches,Professions and applied sciences,Higher education

P. Robert-Jan Simons, Utrecht University, Netherlands; Manon Ruijters, Twynstra Gudde Management Consultants, Netherlands;

A mindset is a holistic total of assumptions, knowledge, attitudes and behavioral intentions, mostly implicit, emotion related complex systems of thought. Well-known are the fixed and growth mindset as studied by Caroll Dweck. She however confined the concept of mindset to mindsets about the mind. This is a pity because there are many more mindsets. In this contribution we will discern mindsets related to (professional) learning. Recently, Simons and Ruijters claimed that real professionals are learning professionals. What mindsets about learning do they need? The learning mindsets will also be illustrated from several of our studies: teachers learning to give more and better feedback, (PhD-) students giving peer feedback to each other, and adult people reflecting on their work related learning. One set of these mindsets relates to feedback giving and receiving. Another set refers to conceptions of learning, both in terms of outcomes and of processes of learning.

Developing a multilevel learning programme ñ Evidence from complementary work-related interventions

Mixed-method research,Professions and applied sciences,Workplace learning,Learning in context

Susanna Paloniemi, University of Jyvaskyla, Finland; Katja Vahasantanen, University of Jyvaskyla, Finland; Paivi Hokka, University of Jyvaskyla, Finland; Anneli Etelapelto, University of Jyvaskyla, Finland;

Amid the economic, managerial and societal challenges of the 21st century, there is an increased need to develop working life to increase productivity and innovativeness. Simultaneously, work communities and organisations need to engage in continuous professional learning. Therefore, work organizations are expected to develop their work cultures, processes and structures. Similarly, individual professionals (employees and leaders) must continuously develop their knowledge and competences, and transform their professional identities. Thus, there is a need for new kinds of interventions promoting multilevel professional learning for, through and at the work. In this paper, we presume that the promotion of professional agency and identity negotiations are necessary for multi-level professional learning. Based on the findings of three complementary work-related interventions (an identity coaching programme, a leadership coaching programme and a dialogical work conference) implemented in an education and a health care organization, we summarize practical conclusions for developing a multilevel learning programme. The findings demonstrate and confirm the central meaning of professional agency in work-related learning and professional development, both for individuals and communities. As necessary components for successful multilevel learning we suggest the following: i) support for professional identity crafting, ii) enabling participation and influencing in work community/organization, and iii) applying agency-promoting leadership.

Exploring learning through social networks

Cognitive skills,Professions and applied sciences,Workplace learning,Communities of learners,Communities of practice

Hans Gruber, University of Regensburg, Germany; Felix von Held, Institute for Innovation and Change Methodologies, Germany;

Learning is a process of active participation in shared social-cultural activities. Organisations can actively shape themselves and their environment as they are agents of intelligent and creative activity. In organisational learning collective creativity plays a central role. So far, only a few theoretical approaches have tried to link creativity to the dynamics of social structures. The aim of this study was to empirically explore creativity in the dynamics of social networks. A longitudinal design with three measurement points was used. 70 participants (BMW group managers) of six networks participated. The research project provides direct empirical validation of creativity in network development in the context of the factor model on collective creativity. The data support the link between creativity, social network structure, and network development.

N 5

29 August 2015 08:45 - 10:15

Room Brown_B2

Symposium

Comprehension of text and graphics

The use of external representations in word problem solving

Keywords: Cognitive skills,Comprehension of text and graphics,Instructional design,Mathematics,Problem solving,Reading comprehension

Sig's: SIG 2 - Comprehension of Text and Graphics

Chairperson: Lieven Verschaffel, KU Leuven, Belgium

Organiser: Lieven Verschaffel, KU Leuven, Belgium

Discussant: Catherine Thevenot, University of Geneva, Switzerland

Mathematical word problem solving is considered to be an important part of the elementary schoolís mathematics curriculum. It is assumed that word problems are a good vehicle to teach children how to construct and apply mathematical models to problem situations in the real world, and to develop general problem solving skills. However, many children have great difficulties solving these problems. Especially the construction of a representation of the problem and linking that representation to an accurate mathematical model turn out to be of great difficulty, esp. when the word problem is of a non-standard nature. Many researchers and curriculum designers have proposed various ways to help children to make these critical steps of the mathematical modeling cycle, e.g. by providing children various kinds of pictorial or schematic representations or by stimulating/teaching them to create a representation of their own. Despite these attempts, we still do not have a good insight into the processes involved in childrenís creation or use of such external representations, on their impact on childrenís solution processes and outcomes, and on optimal ways of teaching them. The goal of the symposium is to bring together four papers that report recent research on the role of external representations in mathematical word problem solving, and to discuss them from a cognitive-psychological and educational perspective. While all four studies involve pictorial and/or schematic representations for word problems, they include a variety of problems and populations, ranging from beginning elementary school children solving additive word problems to in-service elementary school teachers.

The use of diagrams to promote additive reasoning in primary school

Experimental studies,Student learning,Comprehension of text and graphics,Problem solving,Mathematics,Primary education

Terezinha Nunes, University of Oxford, United Kingdom; Peter Bryant, Oxford University, United Kingdom; Petrina Leo, University of Oxford, United Kingdom; Pinxiu Shen, University of Oxford, United Kingdom; Deborah Evans, University of Oxford, United Kingdom;

The question of how problem solvers represent information about a problem in a way that helps them to find a solution is central to understanding mathematical learning. This paper focuses on diagrams, i.e. external iconic representations that are structural or functional analogs of what they represent. In mathematics education, diagrams are hypothesized to function as tools for thinking and to facilitate teacher-pupil communication, thereby advancing learning. A short-term intervention was carried out in a randomized control study with 5th Graders in Oxford to assess the effectiveness of diagrams in advancing problem solving. Three groups received instruction in problem solving, two with the support of diagrams and one without diagrams. In the three groups, the researcher promoted learning by asking pupils to explain their reasoning and by posing probing questions. A control group did not receive any intervention between the pre- and post-tests. During the intervention, diagrams facilitated teacher-pupil communication as indicated by dialogues. At post-test, an ANCOVA showed that the taught groups outperformed the control group in a problem solving measure of additive reasoning that contained problems of the same type as those used in the intervention, but not in a general measure of additive reasoning problem solving. There were no differences between the three taught groups. Thus, this short-term intervention did not provide support for increased success in problem solving when diagrams are used in teaching. However, longer interventions and the consistent use of diagrams throughout primary school may reveal the benefits expected from diagrams as tools for thinking.

Drawings and tables as cognitive tools for solving non-routine word problems in primary school

Experimental studies,Instructional design,Comprehension of text and graphics,Problem solving,Mathematics,Primary education

Timo Reuter, University of Koblenz-Landau, Germany; Wolfgang Schnotz, University of Koblenz-Landau, Germany; Renate Rasch, University of Koblenz-Landau , Germany;

External representations play a central role in the process of word problem solving. This study aims to shed light on teacher-provided representations as cognitive tools for primary students when working on non-routine word problems. Non-routine word problems are characterized by the fact that they cannot be solved by simply applying familiar routine calculations due to their demanding mathematical structure or complex situations described in the problem text. Since primary students often do not generate external representations, the present study examines the questions if providing students with a representation facilitates problem solving in general, and what type of representation (table or drawing) and what level of support provided in the representation is most helpful. In an experimental design we studied a sample of 199 4th-graders who worked on six non-routine word problems. An experimental group received problems accompanied by tables and drawings with different levels of support. A control group received no representations. First results indicate that providing drawings or tables does not facilitate problem solving in general. However, if a representation is provided, a drawing is more helpful than a table.

Helping pupils to solve word problems more realistically by changing the text or the illustration?

Experimental studies,Instructional design,Comprehension of text and graphics,Problem solving,Mathematics,Primary education

Lieven Verschaffel, KU Leuven, Belgium; Anke Weyns, KU Leuven, Belgium; Tinne Dewolf, KU Leuven, Belgium; Wim Van Dooren, KU Leuven, Belgium;

Studies have amply shown that elementary school pupils have a tendency to neglect their everyday life knowledge when solving school mathematical word problems (Verschaffel et al., 2000). Most evidence comes from studies that confronted pupils with words problems that are problematic from a realistic point of view (so-called P-items). Dewolf et al. (2014) tried to help pupils to solve such P-items more realistically by presenting these items together with illustrations that provide a global depiction of the problem situation. However, no effect of these illustrations was found. In the present study, 290 upper elementary school children received a test consisting of seven P-items. They were divided in four conditions, in order to investigate whether emphasising the realistic modelling complexity in the representational illustration (IL+TE-), in the problem text (IL-TE+) or in both (IL+TE+) could help pupils to solve P-items more realistically, as compared to providing no help (IL-TE-). The findings showed a significant positive effect of emphasizing the realistic modelling complexity in the problem text. There was, however, no effect of emphasising this complexity in the illustration or an interaction effect between both manipulations. Some possible explanations will be discussed.

Teachersí competence in and use of visual representations in word problem solving instruction

Mixed-method research,Teacher professional development,Comprehension of text and graphics,Problem solving,Mathematics,Primary education

Anton Boonen, VU University Amsterdam, Netherlands; Helen Reed, VU Amsterdam, Netherlands; Judith Schoonenboom, University of Vienna, Austria; Jelle Jolles, VU Amsterdam, Netherlands;

The goal of this study was to examine teachersí own competence and didactical use of visual representations when implementing a whole-class teaching intervention focused on non-routine word problem solving. Two research questions were posed: (1) When do teachers use visual representations in the word problem solving process and what kinds of visual representations do they use? and (2) What is the quality of the representation process and of the visual representations used? This study involves eight mainstream sixth grade teachers from five (sub)urban elementary schools in the Netherlands who felt competent and motivated to contribute to this research. Descriptive statistics of the quantitative measures regarding visual representation type, visual representation form, quality of the construction process (i.e. transparency, correctness, completeness), quality of the visual representations (i.e. correctness, completeness, functionality), diversity and flexibility were reported. The findings of this study showed that all but one teacher mainly used visual-schematic representations. However, for a lot of word problems also arithmetic representations were used. Further, the most frequent form of visual-schematic representation used was the bar model. Teachers were able to model the representation process transparently, but not always correctly and completely. The visual

representations that were made were in most cases functional, but not always accurate. Finally, teachers rarely compared the suitability of different representational forms or reflected what different types of representations contribute to word problem solving. The study presented implications for implementing instructional innovations in mainstream education practice, both in general terms and for word problem solving in particular.

N 6

29 August 2015 08:45 - 10:15

Room Brown_B4

Symposium

Mathematics education

Strategy flexibility in elementary computation tasks: cognitive and instructional factors

Keywords: Cognitive development,Mathematics,Primary education

Sig's: SIG 17 - Qualitative and Quantitative Approaches to Learning and Instruction

Chairperson: Greet Peters, KU Leuven, Belgium

Organiser: Joke Torbeyns, KU Leuven, Belgium

Discussant: Marian Hickendorff, Leiden University, Netherlands

The acquisition and flexible or adaptive use of various strategies on elementary computation tasks is a major goal of elementary mathematics education worldwide (Verschaffel, Greer, & De Corte, 2007). An ever-growing number of studies provides empirical evidence for children's various and ñ to some extent ñ flexible strategy use on single- and multi-digit additions and subtractions. However, our insights into the cognitive and instructional factors that contribute to the development of strategy variety and flexibility is still incomplete. Therefore, this symposium brings together four empirical studies (from three different countries) on the relation between children's strategy competencies on elementary computation tasks and their general cognitive capacities and instructional environment. The first two contributions focus on the relation between children's strategy competencies on multi-digit computations and their general cognitive skills, including working memory, inhibitory control and metacognitive awareness. The third and fourth contribution address children's strategy choices in relation to the instructional approach and didactical tools used in mathematics teaching. In addition to these studies' focus on theoretically and educationally important factors, they all share a methodologically strong design, such as the choice/no-choice method, and advanced analytic tools, including path analyses. As such, these four studies offer building blocks to both broaden and deepen our understanding of children's acquisition of (the educationally important goal of) strategy variety

and flexibility or adaptivity. The discussion of Marian Hickendorff, expert in the domain of cognitive psychology and mathematics education, will focus on the theoretical, methodological and educational relevance of the contributions.

Elementary school childrenís use of indirect addition in relation to working memory competencies

Quantitative methods,Teaching/instruction,Cognitive skills,Numeracy,Mathematics,Primary education

Greet Peters, KU Leuven, Belgium; Joke Torbeyns, KU Leuven, Belgium; Lieven Verschaffel, KU Leuven, Belgium;

This study focused on childrenís use of the direct subtraction (DS) and indirect addition (IA) strategy when mentally solving subtractions in the number domain up to 1000, taking into account their working memory (WM). Sixty-nine 6th-graders participated in 3 sessions, and each time they solved an Arithmetic Task and a WM Task. All Arithmetic Tasks consisted of 10 subtraction problems (5 DS-problems; 5 IA-problems) and were offered in 1 choice condition (children could choose between DS and IA on each subtraction) and 2 no-choice conditions (they had to use either DS or IA). The IA-strategy was used frequently and efficiently. No effect of WM was found on frequency; efficiency analyses showed an interaction between condition, problem type and WM group only for accuracy, not for speed. Surprisingly, only children with lower WM capacities fitted their strategy choices to their individual strategy speed abilities. We will discuss the theoretical, methodological, and instructional implications.

Cognitive and metacognitive predictors of flexibility in mental calculations

Quantitative methods,Student learning,Cognitive development,Cognitive skills,Mathematics,Primary education

Charalambos Lemonidis , University of Western Macedonia , Greece; Dimitris Pnevmatikos, University of Western Macedonia, Greece; George Liguras, University of Western Macedonia, Greece;

Flexibility in mental calculation requires knowledge of a variety of strategies that could be used to solve computational problems as well as the ability to choose the strategy that is most efficient for the specific problem and particular individual. However, subjectsí strategy flexibility is also constrained by their individual working memory capacity, their inhibition control competencies and their metacognitive awareness. Therefore, we analyzed childrenís flexibility in mentally solving multi-digit additions and subtractions in relation to their metacognitive awareness, working memory and inhibition skills. Two hundred twenty three sixth graders were asked to mentally calculate multi-digit additions and subtractions, and to reflect on their strategy choices on each trial. Moreover, they solved two working memory tasks and three Stroop-type tasks. The flexibility score for each individual child was calculated using the choice/no-choice method. Path model analyses showed that metacognitive awareness, working memory and inhibition skills predict 18.6% and 12% of the flexibility score on respectively multi-digit additions and

subtractions. The theoretical and educational significance and implications of these findings will be discussed.

How external number representations affect first-gradersí enumeration strategy: The twenty-frame

Quantitative methods,Teaching/instruction,Cognitive development,Cognitive skills,Mathematics,Primary education

Andreas Obersteiner, Technische Universitat Munchen (TUM), Germany; Kristina Reiss, Technische Universitat Munchen (TUM), Germany; Stefan Ufer, Ludwig-Maximilians-Universitat (LMU), Germany; Koen Luwel, KU Leuven, Belgium; Lieven Verschaffel, KU Leuven, Belgium;

External number representations are commonly used throughout the first years of instruction. An example of such a representation is the twenty-frame, a grid that contains two rows of 10 dots each. Within each row, dots are organized in two groups of five. The assumption is that in enumeration tasks, children are able to adapt their enumeration strategy by making use of these structural features, rather than relying on a one-by-one counting strategy. To date, however, there is no empirical evidence for this claim. We compared first-grade childrenís performance on two types of computerized enumeration tasks, in which between one and 20 dots were presented either in random arrangements or on a twenty-frame. The number of dots was a strong predictor of response times in the enumeration task with random arrangements, suggesting a one-by-one counting strategy, but not in the twenty-frame task, suggesting an enumeration strategy based on the dot pattern. Furthermore, effective strategy use on the twenty-frame task was correlated with performance on a number and arithmetic test, even when other cognitive variables such as working memory were statistically controlled. These results support the claim that the use of a specific external number representation such as the twenty-frame influences strategy use and can eventually support numerical learning.

Effects of instruction on studentsí strategy choice for multi-digit additions and subtractions

Quantitative methods,Teaching/instruction,Cognitive development,Cognitive skills,Mathematics,Primary education

Meike Gruessing, Universitat Vechta, Germany; Julia Schwabe, University of Kassel, Germany; Aiso Heinze, Leibniz Institute for Science and Mathematics Education (IPN), Germany; Frank Lipowsky, University of Kassel, Institute of Educational Science, Germany;

In mathematics education, two instructional approaches are suggested to teach children adaptive strategy use. The explicit approach encompasses the explicit teaching and practicing of selected strategies, whereas the problem-solving approach emphasizes the analysis of task characteristics and the individual generation of efficient strategies. Results of an experimental study indicate that the effects of these instructional approaches on studentsí accuracy and adaptivity do not differ significantly, neither in the short-term nor in the long-term. In a further analysis we asked whether the children of both groups differed in their choice of specific strategies. The sample

comprised 73 third-graders divided into two groups. The students attended a one-week holiday course taught by two research assistants following teaching scripts of the explicit and the problem-solving approach. Data was collected by pre-, post- and two follow-up-tests (after 3 and 8 months). All tests consisted of 8 multi-digit addition and subtraction tasks suggesting specific strategies. Studentsí solutions were categorized using a system of strategy types. Chi-squared tests for homogeneity indicate that the distribution of the chosen strategies is significantly related to the group variable for the post-test and the follow-up-tests but not for the pre-test. The groups differ in the development of their strategy distribution in particular during the three months after the intervention. Fine-grained strategy analyses indicate that studentsí availability of specific strategies is more sustainable in the problem-solving condition, whereas students in the explicit condition temporarily use more demanding strategies.

N 7

29 August 2015 08:45 - 10:15

Room Brown_B5

Symposium

Emotion and affect

Resilience and Teachers: Synergies between research and practice

Keywords: Emotion and affect,Interdisciplinary,Mixed-method research,Motivation and emotion,Synergies between learning, teaching and research

Sig's: SIG 8 - Motivation and Emotion

Chairperson: Susan Beltman, Curtin University, Australia

Organiser: Susan Beltman, Curtin University, Australia

Discussant: Marold Wosnitza, RWTH Aachen University, Germany

This symposium presents current research relating to resilience in a range of education contexts. How to enhance resilience in educators and their students is a widespread concern, particularly where schools are challenging. This symposium examines resilience in pre-service teachers, experienced teachers, school leaders and students themselves. Paper 1, by Australian authors builds on previous work, presenting a systematic review of recent literature identifying constructs important for developing pre-service teachers' capacity for resilience as they prepare for the profession. Paper 2 presents a qualitative study of experienced teachers in Malta, and factors that have contributed to their resilience, particularly when faced with challenging behaviour. Paper 3 presents quantitative data from a large study in China, highlighting, for example, the importance of favourable social environments in schools. Paper 4 presents quantitative and qualitative data generated by South African youths, reminding us that not only is

resilience important for teachers, but that teachers also make a positive difference to youths' resilience processes. All papers illustrate the complex, dynamic nature of resilience as it is shaped by personal and environmental factors or conditions. The symposium is significant as it points to the importance of research in identifying specific factors that shape resilience and how they interplay in different contexts of educational practice.

Resilience Research and Teacher Education

Content analysis,Pre-service teacher education,Emotion and affect,Interdisciplinary,Higher education,Motivation and emotion

Caroline Mansfield, Murdoch University, Australia; Susan Beltman, Curtin University, Australia; Noelene Weatherby-Fell, School of Education, University of Wollongong, Australia; Tania Broadley, Curtin Learning Institute, Curtin University, Australia;

Teacher resilience is an important concept in countries where there are concerns with teacher quality and effectiveness. Recent research has indicated areas where pre-service programs could take some responsibility with suggestions on how they could develop the capacity for resilience in future teachers. Building on an earlier literature review, this paper aims to review more recent papers and book chapters to identify constructs important for teacher resilience and how these may be incorporated into pre-service programs. A systematic search revealed 53 texts which were summarised by a team of 4 researchers. Findings indicate key themes of relationships, wellbeing, emotions and professional skills. The findings from this review are used to propose specific ways in which teacher education programs may enhance the capacity for teacher resilience. There is evidence that the capacity for resilience can be developed, and this paper indicates how this evidence may be translated into practice in teacher education settings

Teachersí Narratives of Resilience: Responding Effectively to Challenging Behaviour

Qualitative methods,In-service teacher education,Emotion and affect,Interdisciplinary,Secondary education

Katya Galea, University of Malta, Malta;

This paper explores the narratives of eight teachers who respond effectively to challenging behaviour in the Maltese educational college system. The objective of the study was to examine the individual and contextual factors that promote teachersí resilience in the face of responding to challenging behaviour in school. It makes use of a narrative exploration of teacher stories, utilizing in-depth interviews to elicit the challenges faced by these teachers as well as the individual and contextual factors that have helped strengthen their resilience. Although the development of resilience was unique to every participant, teachers also shared common factors that helped them overcome, and thrive in the face of, the setbacks they experienced in their profession. Teachers found that individual qualities such as a positive attitude, seeing mistakes as learning opportunities, accepting oneís limitations, adapting lessons to student needs, investing in firm but caring relationships, and remaining calm when responding to challenging behaviour, as well as contextual factors such as support within the school system, helped develop their

resilience. The paper illustrates the variety of challenges teachers face in responding to challenging behaviour, and consequently underlines the significance of resilience for teachers in this respect.

Resilience of Chinese teachers: Confirming a new construct

Quantitative methods,Teacher professional development,Emotion and affect,Interdisciplinary,Primary education,Secondary education

Qing Gu, University of Nottingham, United Kingdom; Li Qiong, Faculty of Education, China;

This paper explores the construct of teacher resilience and the ways in which organizational and relational conditions influence teachersí capacity to be resilient. The research upon which the paper is based adopted a mixed-methods design involving a sample of 455 primary and secondary school teachers in Beijing. This paper reports results from the questionnaire analyses. Confirmatory factor analysis and structural equation modelling (SEM) were used and results supported the validity and reliability of the construct of teacher resilience at the individual level. The analyses also revealed robust underlying dimensions of school leadership, relational and organisational conditions and their direct and indirect effects on resilience in teachers. The paper contributes empirically-grounded evidence to the development of knowledge of teacher resilience.

ìTeachers always helped meî: The nature of teacher actions that matter for African youth resilience

Mixed-method research,In-service teacher education,At-risk students,Interdisciplinary,Secondary education,Motivation and emotion

Linda Theron, North-West University, South Africa; Adam M.C. Theron, North-West University, South Africa;

Teachers are increasingly foregrounded in the resilience literature as instrumental to youthsí positive adjustment to challenging life circumstances. However, there is scant, robust understanding of how teachers facilitate youth resilience processes, particularly in majority world contexts. We mix quantitative and qualitative data, generated by 1137 South African youths in the Pathways to Resilience Project, South Africa, to confirm that many (but not all) teachers are everyday champions of youthsí resilience, and to illustrate that such championship entails extraordinary teacher acts. Independent sample t-tests, as well as inductive and deductive content analyses, indicate that teachers facilitated youthsí positive adjustment to poverty and associated risks when they respectfully acted as quasi-parents. Teachersí playing parent included their providing access to material resources, offering constructive relational spaces, and nurturing powerful youth identities. Such actions imply that teacher championship of resilience requires atypical teacher duties and raises questions about how best teachers should be educated, and supported, to enable -rather than constrain - youth resilience processes.

29 August 2015 08:45 - 10:15

Room Green_A5

Symposium

Other disciplines (philology, art, history, etc)

'Mind the gap!í Defining effective pedagogy for fostering domain-specific reasoning in history.

Keywords: Cognitive skills,History,Reasoning,Secondary education,Teaching/instruction

Sig's: SIG 6 - Instructional Design

Chairperson: Carla Van Boxtel, University of Amsterdam, Netherlands

Organiser: Karel Van Nieuwenhuyse, KU Leuven, Belgium

Organiser: Gerhard Stoel, RICDE / University of Amsterdam, Netherlands

Discussant: Arthur Chapman, University of London, United Kingdom

Fostering historical reasoning is considered a main goal of history education. However, teachers experience many difficulties in organizing concrete practices aimed at historical reasoning. Thus, a gap occurs between ideals and practices. This symposium addresses this gap from a teacher perspective and revolves around three questions: (1) which strategies do teachers apply to develop (aspects of) historical reasoning, (2) how can these strategies be strengthened in current classroom practice, and (3) how can research on classroom practices and experimental studies work together to deepen our understanding of effective approaches to foster historical reasoning? In particular, the symposium focuses on two key aspects of historical reasoning: (1) the use of historical sources, and (2) the construction of historical explanations. Four studies are combined that (a) are conceptualised from a teacher perspective, (b) involve concrete classroom practices, (c) examine (elements of) historical reasoning, and (d) aim at developing teaching strategies to foster students' historical reasoning. Although research questions, focus and concepts are comparable, the studies make use of a variety in research approaches and methodology. Two papers discuss qualitative, observational studies on teacher's use of primary sources in secondary education and the thinking processes they prime. The third paper presents the results of a quantitative, experimental study investigating the role of explicit instruction in developing students' causal reasoning skills. The final study focuses on how teachers address domain-specific reasoning, with the goal of developing a valid observation instrument, to be used for reflection and professionalization.

Observation research on the use of primary sources in Flemish secondary school history classes

Qualitative methods,Teaching/instruction,Reasoning,History,Secondary education,Model-based reasoning

Karel Van Nieuwenhuyse, KU Leuven, Belgium; Hanne Roose, KU Leuven, Belgium; Kaat Wils, KU Leuven, Belgium; Fien Depaepe, KU Leuven, Belgium; Lieven Verschaffel, KU Leuven, Belgium;

Working with sources in secondary school history education is generally considered as an important exercise to foster studentsí historical thinking. Research suggests that teaching approaches play an important role in promoting studentsí understanding of sources, and that the instructional practice accompanying sources raises difficulties. This paper reports on an empirical study, involving 88 classroom observations with 61 teachers, and focusing on primary sources. The kind of primary sources, and especially the instructional practice accompanying them, were examined for Flemish history education. An analytical research tool was built, based on both literature and experiences from previous research into the use of sources. How were primary sources used, and thereto provided with context information? Were they only used as illustration, purely questioned for their content, or also to foster studentsí historical thinking? The analysis includes the differences between the grades. Almost 2/3 of all 322 primary sources touched upon in the classroom, were visual sources, whereas 1/3 were textual. Most primary sources were contextualized to a certain extent. They were especially used as pure illustration or questioned for their content, and far less to foster studentsí historical thinking. The latter questions occurred more frequently in the lower grades. Besides a quantitative analysis, the paper will present an in-depth qualitative analysis of the use of sources, and explanations for the relative lack of attention paid to their role in fostering studentsí historical thinking. Starting from the classroom practices, it will suggest strategies to use sources in ways going beyond a content-related approach.

Teaching causal reasoning in history; let's make things explicit!

Experimental studies,Teaching/instruction,Reasoning,History,Secondary education,Knowledge creation

Gerhard Stoel, RICDE / University of Amsterdam, Netherlands; Jannet van Drie, University of Amsterdam, Netherlands; Carla Van Boxtel, University of Amsterdam, Netherlands;

This paper reports an experimental study that explores the effects of explicit instruction on 11th grade pre-university studentsí ability to reason causally in history. Although previous studies investigated the effectiveness of explicit instruction on topics such as studentís learning of sourcing strategies in history, or on epistemological beliefs in science, the current study takes a more integral approach. Underpinned by the Model of Domain Learning (MDL) explicit instruction is conceptualized as a principle that should focus on (1) causal strategies, (2) second-order concepts and (3) epistemological underpinnings connected to causal reasoning in history. The effects of explicit instruction were explored in a lessons-unit focussing on explaining the outbreak of the First World War. In a randomized pre-test post-test design (N=95) with an experimental and a control condition, effects were investigated on the level of studentsí knowledge (topic, second-order and strategy), epistemological beliefs and ability to construct a

causal explanation in a writing-task. Results show that students in the experimental group develop significantly more knowledge of causal strategies and of some second-order concepts. Their epistemological beliefs seem to shift a little towards a stronger envisage of historical knowledge as constructed and temporary, while at the same time reporting a marginally higher appreciation of academic criteria for generating this knowledge. No general differences between conditions in a causal writing-task focussing on applying this knowledge were found, although in the experimental group significantly more students received a high score at the post-test on the core criterion ëuse of second-order language and causal connectionsí.

The instructional grammar of teaching history: influence of lesson structures on sourcework?

Qualitative methods,Teaching/instruction,Reasoning,History,Secondary education,Learning in context

Mathieu Bouhon, Universite catholique de Louvain (UCL), Belgium; Elodie Vaeremans, Universite catholique de Louvain (UCL), Belgium;

The paper addresses how Belgian Francophone secondary school history teachers have interpreted a new curriculum that is specifically aimed at working with sources and fostering studentsí historical competences. If working with sources is supposed to be at the very heart of the daily classroom activity, it seems that the new curriculum has not brought about great change regarding the existing teaching practices. We report on a qualitative study involving 12 history teachers, selected for their varying epistemological stances, and focusing on the lesson structures, seen as a specific artefact of the grammar of schooling. The purpose of the paper is to analyze the influence of the structure of teaching lessons on the way that is worked with sources within this structure. Results show that most of the lessons involve working with sources but that, regardless of teachersí epistemological beliefs, the hierarchical and sequential organization of the contents framing the lesson remains quite linear and far from the epistemological characteristics of the subject matter. The paper assumes that much more attention must be paid to the grammar of schooling if one does attempt to understand how new curricula are interpreted and implemented by teachers.

An observation instrument of the teaching of historical thinking and reasoning, Teach-HTR

In-service teacher education,Teacher professional development,History,Secondary education,Lifelong learning

Susanna Margret Gestsdottir, University of Amsterdam, Iceland; Carla Van Boxtel, University of Amsterdam, Netherlands; Jannet van Drie, University of Amsterdam, Netherlands;

For some years, historical thinking and reasoning has been an important educational goal for upper secondary education in many countries. The aim is to enable students to understand multiple historical perspectives, define historical significance, analyse sources and discuss change and continuity, to name a few of the central features. However, few studies have focused

on professional development programs for (experienced) history teachers who wish to build up these skills. Teachers often find it difficult to imagine concrete daily teaching practices that are aligned with teaching history as an investigative process, in other words ìwhat it looks like in the classroom.î A useful tool is needed for further professionalization of experienced history teachers who wish to foster historical thinking and reasoning, as well as to assist those who are doing their initial teacher training. This paper reports on the development of the domain-specific observation instrument Teach-HTR. The research questions were: how can the teaching of historical thinking and reasoning be operationalized and observed in upper secondary education? A literature review was conducted to operationalize the dimensions of learning and teaching involved in historical thinking and reasoning. An earlier version of the instrument was pilot-tested on three videotaped lessons and a new version presented to twelve international experts for external evaluation of validity. Results are being coded at the moment and will be discussed in the final paper.

N 9

29 August 2015 08:45 - 10:15

Room Brown_B6

Symposium

Lifelong learning

Perspectives into Transfer of Training

Keywords: Learning in context,Lifelong learning,Motivation and emotion,Vocational education,Workplace learning

Sig's: SIG 14 - Learning and Professional Development

Chairperson: Andreas Gegenfurtner, Maastricht University, Netherlands

Organiser: Andreas Gegenfurtner, Maastricht University, Netherlands

Organiser: Filip Dochy, KU Leuven, Belgium

Discussant: Mien Segers, Maastricht University, Netherlands

Consider an employee who participates in a workshop or training programme. This person will develop new skills and competences during the workshop or training. Afterwards, when the workshop is completed, will this person try to use what was learned? Or will the training remain ineffective? And which factors will motivate this person to transfer the newly developed skills to the job? Questions like these are addressed in research on the transfer of training. In this symposium, we seek to open a platform for recent work on transfer of training, its conceptual framing, its measurement and its environmental influences. Presentation 1 focuses on the

conceptual framing of transfer: it presents a model devoted to analysing behaviours that prevent learning transfer. Presentation 2 focuses on the measurement of transfer: it presents empirical examples of direct and indirect evaluation of training effectiveness. Presentation 3 focuses on support structures of transfer: it analyses which aspects of supervisor support are regarded useful from the trainee and the supervisory perspective. Presentation 4 focuses on contexts of transfer: it examines the relative influence of environmental factors on transfer intentions. All these presentations from European research groups describe the processes that contribute to or hinder transfer of training. A concluding commentary from a distinguished scholar in professional learning and human resource development will discuss implications for theory development and training practice.

Model of Analysis for Learning Transfer Preventing Behaviour

Reasoning,Vocational education,Workplace learning,Lifelong learning,Model-based reasoning

Kaethe Schneider, Friedrich Schiller University Jena, Germany;

The learning results of an educational programme are more likely to be effectively transferred when the learning objectives of the programme relate to a learning deficit determined. Besides building up the target mental structures determined, it is necessary to modify the learning transfer preventing mental structures. The goal of this study consists in developing a model for analysing learning transfer preventing behaviours. The model to be devised will be a priori and synthetic. We establish essential properties and generalizations by intuitive reasoning as a direct observation by the intellect and by deductive reasoning. The model represents the conditionality of intentional learning preventing behaviour (B), which consists of the actual behaviour observed: The environment or the context (C) and the mental structures (MS) are necessary conditions for capturing the intentional behaviour. MS are the mental triggers of the intentional behaviour. This model of learning transfer preventing behaviours makes it clear that the objective-impeding mental structures, which are in competition with the sought mental structures, assume a central role in effective learning.

Strategies and Instruments to Evaluate Transfer of Learning: Reflections from Practice

Assessment methods and tools,Vocational education,Workplace learning,Lifelong learning

Pilar Pineda, Universitat Autonoma de Barcelona, Spain; Carla Quesada-Pallares, University of Leeds, United Kingdom;

Transfer of learning has recently drawn attention in the field of continuous training; however, assessing its effectiveness is still a challenge for scientists and practitioners. One way to approach transfer of training evaluation is the method known as ëdirect evaluationí, which consists in developing specific tools or techniques to assess knowledge, skills and attitudes that trainees have learned throughout their training and have applied in the workplace. To do so, evaluators must produce specific tools for each training activity and must consider collecting data at various moments or even from varied agents in order to contrast the information collected. The other way to approach transfer of training evaluation is the ëindirect evaluationí; it

consists of assessing the variables that facilitate or hinder transferbehaviour allows the creation of a predictive model, as the FET (Factors to Evaluate Transfer). This paper goes beyond research and connects the academic tradition of evaluation with the actual practice of evaluating training transfer in organizations. We show that not all tools or techniques are adequate for all situations or agents. Moreover, ëdirect evaluationí is not always the best approach to measure transfer of training. The FET model (Pineda-Herrero, Quesada-Pallares & Ciraso-Cali, 2014) belongs to an ëindirect evaluationí, which can overcome the problems we found in the direct approach. The potential and limitations of transfer evaluation approaches are discussed, taking into account their effectiveness, cost in terms of time and human resourcesbehaviour applicability to different training settings and organizations.

A Supervisorsí Perspective on Their Role in Transfer of Training

Qualitative methods,Vocational education,Workplace learning,Lifelong learning

Natalie Govaerts, KU Leuven, Belgium; Eva Kyndt, University of Leuven, Belgium; Filip Dochy, KU Leuven, Belgium;

The literature has indicated that support of the supervisor is critical for employees to transfer the knowledge, skills and attitudes developed during a training back to their job. However, still little is known about which specific supervisor behaviours and attitudes enhance transfer of training. A systematic literature review by Govaerts and Dochy (2014) demonstrated the multidimensionality of this supervisor support and discerned 24 subcategories. The purpose of this study is to unravel which of these 24 specific behaviours and attitudes supervisors adopt to facilitate transfer of training. It is also explored what kind of supportbehaviour why so, supervisors consider as conducive for successful transfer. The present study reports on a qualitative study in which 17 supervisors from ten organisations were interviewed. Preliminary findings show that the majority of the 24 categories of specific supervisor support are provided in practice. However, it appears that particularly goal setting, involvement in training selection, participation in training and monitoring the application of the training characterize the role of the supervisor in transfer of training.

Intention to transfer: Environmental factors influencing transfer intentions in study and work

Quantitative methods,Vocational education,Workplace learning,Learning in context,Lifelong learning,Motivation and emotion

Laurent Testers, Open University, Netherlands; Andreas Gegenfurtner, Maastricht University, Netherlands; Saskia Brand-Gruwel, Open University, Netherlands;

An important goal of students as well as for instructional designers is to achieve long-term transfer of learning, that is the application of newly acquired competencies learned in one context to another context. Extensive research during more than a century shows that this fundamental aspect of education often occurs poorly or not at all, leading to what is called a Transfer Paradox. The objective of this research was to develop an instrument that measures the

influence of a number of key variables on the transfer process. The context of this research was a training course in information literacy. The course aimed at teaching learners to efficiently, effectively and critically find their way in the rapidly expanding amount of information in two transfer contexts: (a) their university studies and (b) their workplaces. Using the input of 96 adult distance learners at the Open University of the Netherlands, the questionnaire investigated the traineesí perception of the influence of key environmental variables from the literature on their intention to transfer, not only to their study but also to their work. Hierarchical multiple regression analyses indicated that the most important factor that influenced intention to transfer was opportunity to use. Feedback, openness to change, positive personal outcomes and personal negative outcomes had a negligible influence. These findings were comparable between the two transfer contexts of study and work. We discuss the implications of these results in terms of providing sufficient opportunities to apply new learning.

N 10

29 August 2015 08:45 - 10:15

Room Yellow_G2

Symposium

Research methodology

How to improve validity and cross-cultural equivalence in international comparative studies?

Keywords: Assessment methods and tools,Comparative studies,Mixed-method research,Organization of educational research(sounds strange),Quantitative methods,School effectiveness

Sig's: SIG 18 - Educational Effectiveness

Chairperson: Eckhard Klieme, German Institute for International Educational Research (DIPF), Germany

Organiser: Dominique Lafontaine, Universite de Liege, Belgium

Organiser: Susanne Kuger, The German Institute for International Educational Research (DIPF), Germany

Discussant: Jan-Eric Gustafsson, University of Gothenburg, Sweden

International comparative studies provide rich data to explore the links between contextual or non-cognitive variables and studentsí achievement in a broad variety of education systems. Valid results at the national level and cross-national comparisons not only require instruments meeting the traditional standards for reliability and validity. Reaching invariance and improving cross-

cultural equivalence should become a standard target for ongoing and future comparative studies; therefore, common method and response-style bias need to be addressed. There is growing evidence that common method/response style bias may lead to poor validity or lack of equivalence, and consequently, may jeopardize cross-cultural comparisons. One of the main reasons for these persistent issues is that many of the contextual and non-cognitive constructs in comparative studies are measured using Likert-scales, especially sensitive to response style biases. Response styles biases can be addressed before (procedural remedies) or after data collection (statistical remedies) (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). The symposium will use the data of several international comparative studies, PISA 2009, PISA 2015 field trial data and IEA ICCS. On the one hand, issues related to the lack of cross-cultural invariance will be documented for the three studies; on the other hand, new methodological approaches that have been implemented in order to deal with common method/response style bias and consequently improve validity and cross-cultural equivalence either before or after data collection will be presented and critically reviewed.

Cross-national measurement of the multicultural school climate

Quantitative methods,Cultural diversity in school,Social aspects of learning,Secondary education,Communities of learners

Svenja Vieluf, German Institute for Internat. Educational Researc, Germany; Brigitte Steinert, German Institute for Internat. Educat. Research, Germany; Eckhard Klieme, German Institute for International Educational Research (DIPF), Germany;

In the present study multicultural school climate was examined in a cross-national setting. The cross-national generalizability of the scale and its association with student achievement was analyzed. Using a sample of 4,443 students in 24 countries and a balanced four-item scale, a multiple group bifactor model, controlling for acquiescence response style, was applied. The model had a good fit cross-nationally and multiple group analysis supported configural equivalence, but not metric or scalar equivalence. Across countries, multicultural school culture was positively associated with science achievement; students reporting a better multicultural school climate had higher scores on the achievement test. These findings emphasize the importance of analyzing ingroup-outgroup processes in educational settings for understanding educational disparities across different education systems.

How to enhance validity and cross-cultural equivalence in opportunities-to-learn in reading?

Psychometrics,Quantitative methods,School effectiveness,Writing/Literacy,Secondary education

Dominique Lafontaine, Universite de Liege, Belgium; Svenja Vieluf, German Institute for Internat. Educational Researc, Germany; Ariane Baye, University of Liege, Belgium; Christian Monseur, University of Liege, Belgium;

Response style biases linked to Likert scales may jeopardize the validity and cross-cultural equivalence of constructs in comparative large-scale assessments. In our study, a within-item

IRT model was implemented in order to disentangle common method factor from the target OTL constructs in PISA 2009. This approach gave promising results: evidence was found that the IRT tridimensional model improved the validity of the measurement of OTL in the PISA context. The common factor on which all OTL items loaded had robust negative correlations with reading achievement in all of the countries except Finland. On the contrary, strong positive correlations between target OTL and reading achievement were observed. The tridimensional model also met two out of the three invariance criteria (configural and metric, but not scalar invariance). Evidence that this solution improved the predictive validity of the target construct was found, comparing the tridimensional model with the four factors of a preliminary CFA analysis. The common factor was strongly correlated with response-style indices (acquiescence and satisficing behavior) computed on broader sets of PISA items, confirming the hypothesis that this common factor is mainly a response style or common method factor, and not an OTL one. The multilevel regression model showed that the common factor is mainly an individual response style. However, the between country variance was highly correlated with SES and reading ability: countries scoring high on the common factor are the poorest and the least performing ones in reading.

Improving scores comparability in ILSA contexts using the Alignment methodology

Comparative studies,Quantitative methods,Citizenship education,Communities of learners

Deana Desa, IEA Data Processing and Research Center, Germany; Ralph Carstens, International Association for the Evaluation of Educational Achievement (IEA), Germany;

In educational assessment programs (e.g., TIMSS, PIRLS, ICCS), reporting comparable scores is critically important to better understand its influences on academic achievement as a compliment to the other academic achievement predictors such as student psychological factors, family background, teacher instructions and curriculum practices. Satisfactory measurement properties of the reported scores such as invariant measurement across groups (e.g., gender, countries, and test cycles) are emphasized providing that there are comprehensive attention and treatment for reporting and interpreting comparable scores. To achieve this goal, in this paper, an overview of ongoing studies on measurement invariance using the traditional MGCFA approach is essentially considered, and critical reviews and practical implications of the Alignment methodology applied to Likert attitudes, perceptions and behaviors scales related to civics and citizenship education of the ICCS program (International Civic and Citizenship Education Study) will be presented. Several aspects within the context of large-scale assessment programs will be addressed. An investigation of to how different response distributions of each measure of the underlying scale contribute to the differences or similarities reveals unbiased measurement across cultures and societies. Measurement invariance and non-invariance resulted from the analysis may explain adequate comparability and improve scores interpretation of the scales.

Ordering and Gender Effects in Anchoring Vignettes for Noncognitive Student Factors

Comparative studies,Experimental studies,Quantitative methods,Attitudes and beliefs,Secondary education

Tamara Marksteiner, University of Mannheim, Germany; Jonas Bertling, ETS, United States; Eckhard Klieme, German Institute for International Educational Research (DIPF), Germany;

Student self-report questions using a Likert-type format are the most commonly used question type for noncognitive student factors (e.g., attitudes towards school) in international large-scale assessments across different domains and countries. A robust finding is that the direction of relationship between those indices and achievement outcomes is inconsistent on the individual level versus the aggregated level (cf. ìAttitude achievement paradoxî). PISA 2012 has introduced anchoring vignettes to address this problem with results showing promising effects and increased consistency in relationships observed. This paper builds upon that work in addressing two important research questions. Three different sets of anchoring vignettes were used and data from a large cross-national sample from a K-12 population was analyzed. Through a fully randomized experiment, we investigated, first, which order (vignettes first, or self-reports first) is more appropriate concerning the validity of the derived scales and, second, whether there is an effect of the gender of the person described in the vignettes on student responses. No order effects but small effects based on gender were found. Vignettes with a male person triggered slightly higher self-reported anxiety ratings, even though the effect size was very small. In addition, female respondents reported higher test anxiety than male respondents ñ independent of the gender of the person described in the vignettes. Effects were consistent across countries investigated. These findings significantly extend the knowledge base on the benefit of anchoring vignettes for use in educational large-scale studies. Practical implications for design of future large-scale assessments will be discussed.

N 11

29 August 2015 08:45 - 10:15

Room Green_A6

Symposium

Social interaction in L&I

Co-construction processes in STEM-education

Keywords: Developmental processes,Learning in context,Primary education,Science education,Social interaction

Sig's: SIG 10 - Social Interaction in Learning and Instruction

Chairperson: Carla Geveke, University of Groningen/ Hanze University of applied sciences, Netherlands

Organiser: Heidi Meindertsma, Rijksuniversiteit Groningen, Netherlands

Organiser: Henderien Steenbeek, University of Groningen, Netherlands

Discussant: Christine Pauli, University of Fribourg, Switzerland

This symposium aims to shed a light on theoretical and empirical issues concerning co-construction processes in STEM-education. A child?s STEM-performance is co-constructed by the child and the context. The starting point is that by studying interaction patterns on the short-term timescale, learning and development can better be understood as well as the teacher's role. First, a complexity approach on children's STEM-performance will be presented. Three theoretical aspects of such an approach (co-constructed process, learning triangle, role of interlinked micro- and macro-timescales) will be highlighted and empirically illustrated. The other three presentations are empirical in nature. The second presenter focuses on the effect of co-construction on the expressed part of Pedagogical Content Knowledge of the teacher. By studying real-time interactions during out-of-school activities, different attractor states (stable system states) are distinguished and their development is followed over time. In the third presentation, classroom interactions of young children's mathematicising activity in early years classroom are studied during a 29-month observation period. The study underscores the mediational role of semiotic scaffolding in raising the numerical awareness of young children and the teacher's ability to assist the child in active participation in collective mathematising. The final presentation will focus on the co-construction of scientific reasoning during a Video Feedback Coaching (VFC) program for upper grade teachers. Preliminary results point to change in how scientific reasoning is co-constructed over time, in the behavior of both teachers and students. An expert in the field will discuss the scientific and educational implications of the presented findings.

The role of co-construction in building childrenís science performance; a complexity approach

Student learning,Teaching/instruction,Developmental processes,Social interaction,Science education,Learning in context

Henderien Steenbeek, University of Groningen, Netherlands; Heidi Meindertsma, Rijksuniversiteit Groningen, Netherlands;

There is evidence that children show a decrease in performance and interest in science education with increasing age (Engel, 2009). The question is what processes and mechanisms account for this change in performance and interest. In order to answer this kind of empirical questions, it is important to shed a theoretical light on what constitutes childrenís science performance. In this talk, a complexity approach on childrenís science performance in classroom settings will be presented. A central term used is that of co-construction of knowledge (see Granott, 2002; Sorsana, 2008). Three theoretical aspects of such an approach will be highlighted and empirical illustrated. The first aspect is the relation between childrenís real-time science performance and learning as a co-constructed, transactional process (Fogel, 2009; Murphy, 2007; Sorsana, 2008). The second aspect concentrates on the learning-triangle (child-teacher and material), which is a suitable starting point to get a grip on change in childrenís science performance. Thirdly, the role of interlinked micro- and macro-timescales will be discussed, i.e., studying childrenís real-time science performance and the coupling with longer-term measures of changes in childrenís science performance.

Expressed Pedagogical Content Knowledge in Out-of-School Activities

Video analysis,Teaching/instruction,Developmental processes,Science education,Primary education,Learning in context

Carla Geveke, University of Groningen/ Hanze University of applied sciences, Netherlands; Henderien Steenbeek, University of Groningen, Netherlands; Jeannette Doornenbal, Hanze University of Applied Sciences, Netherlands; Paul Van Geert, Rijksuniversiteit Groningen, Netherlands;

Out-of-school activities ówhich are taking place during school hours, but outside the school contextó often do not meet criteria of high-quality pedagogical content knowledge. By inspecting the real-time interaction during day-to-day practice, the expressed part of pedagogical content knowledge (EPCK) can be observed. These short-term interactions self-organize over time into particular stable system states: attractor states, e.g., a typical form of EPCK. Our main question is: Which attractor states of EPCK can be distinguished in out-of-school activities when using real-time measurements at the short-term time scale and how are these states emerging? This study concerned out-of-school activities of pupils of upper classes of primary schools: visit to a museum, Childrenís University, science center, and a mobile science classroom (a truck called the Salt Express). A multivariate coding scheme is used. A principal factor analysis of the time series of all the variables reduced the number of dimensions. The cluster analyses dived the time-series into a sequence of EPCK states. Results show that all four out-of-school activities had a dominant non-EPCK attractor state with a recurrent pattern. The medium size EPCK attractor state was characterized by high quality EPCK, determined by one factor focusing on pupilsí concepts and teacherí neutral reactions. The least prevalent cluster included one dominant factor focusing on question-reaction patterns. The time-series showed a change over time towards a higher quality of EPCK. Relevance of this study is that it provides insight in EPCK and its emergence, and guidelines for improving out-of-school activities.

Semiotic scaffolding of childrenís engagement in collective mathematizing in an early years class

Conversation/ Discourse analysis,Instructional design,Social interaction,Mathematics,Early childhood education,Cooperative/collaborative learning

Kristiina Kumpulainen, University of Helsinki, Finland; Sinikka Kaartinen, University of Jyvaskyla, Finland;

This study investigates the development of young childrenís mathematicising activity in an early years classroom whose pedagogy draws on the sociocultural notions of learning and development as well as on semiotic theory. Here, specific attention is placed on the role of semiotic means in social activity, accounting for the use of iconic and indexical pre-symbolic sign vehicles and semiotic chaining in supporting childrenís engagement and learning in collective mathematizing. The study illuminates collective negotiation processes constructed into being across classroom members and how these evolved over time. Its primary data consist of videotaped episodes of classroom interaction that illuminate the engagement processes of 11

children from the age of three years to five years in collective mathematising. The social interactions of the classroom were subjected to a qualitative micro-level analysis based on applied discourse analysis (Kaartinen & Kumpulainen, 2001; Kaartinen & Latomaa, 2012). The analysis focused on the role of pre-symbolic sign vehicles as semiotic tools in joint activity, nature of mathematicising activity, and strategy selection. The results of the study show how the young childrenís engagement in collective mathematizing developed during the two-year period from nonverbal participation to verbal participation, and were evidenced by the following core elements: attention to numeracy, the learning of number words, object counting and mathematical storytelling. The study underscores the mediational role of semiotic scaffolding in raising the numerical awareness of young children and the teacherís ability to assist the child in active participation in collective mathematising.

Co-construction of scientific reasoning during Science and Technology education

Student learning,Teacher professional development,Cognitive development,Science education,Primary education,Learning in context

Sabine van Vondel, University of Groningen, Netherlands; Henderien Steenbeek, University of Groningen, Netherlands; Paul Van Geert, Rijksuniversiteit Groningen, Netherlands;

Learning is often seen as a socially situated process. This means that both teacher and pupils make unique contributions to the pupilsí learning process, and they need to constantly adapt to their partnersí contribution in interaction. Thus, when studying learning-in-interaction as a dynamic process, it is important to focus on the roles of both teacher and pupil together as they co-construct meaning. Teacherís use of questions is essential to stimulate pupilsí participation during science and technology education. During a Video Feedback Coaching program, upper grade teachers are supported to optimize their questioning skills in order to stimulate pupilsí scientific reasoning. The goal of the present study is to gain insight into how teacher and pupils co-construct scientific reasoning and how this develops during a Video Feedback Coaching program. Microgenetic measurements were used in order to see patterns of change in the co-construction. Preliminary results point to change in how scientific reasoning is co-constructed over time, in that teachers pose more stimulating questions and students react by reasoning on a higher level of complexity during the intervention. The results provide insight into how teachers can elicit and foster high levels of complex reasoning and how this changes during an intervention specifically focused on optimizing teacher-pupil interaction patterns. In addition, examples can serve as best-practices to show other teachers the importance and relevance of adopting a stimulating and open teaching style in order to co-construct scientific reasoning skills.

N 12

29 August 2015 08:45 - 10:15

Room Green_A1

Symposium

Early childhood education

Overcoming the odds in high-risk-families with effective early childhood education

Keywords: At-risk students,Early childhood education,Learning and developmental difficulties,Parental involvement in learning

Sig's: SIG 5 - Learning and Development in Early Childhood

Chairperson: Andrea Lanfranchi, University of Applied Sciences of Special Needs Education, Switzerland

Organiser: Tanja Jungmann, University of Rostock, Germany

Organiser: Orla Doyle, University College Dublin, Ireland

Discussant: Iram Siraj, University College London, Institute of Education , United Kingdom

Educational careers are strongly influenced by early childhood experiences. For instance, the PISA studies demonstrated the close connection between social status and school success (OECD, 2010). Supporting these children at school entry may not compensate for these disadvantages. Therefore, early childhood is seen as a critical phase for intervention in order to alter long-term educational opportunities. Internationally, a growing body of research focuses on early intervention programs for families that are living in environments that may jeopardize healthy child development. Early intervention programs aim at increasing educational opportunities by providing children with early support from birth onwards. Other than in formal education, the child is not the primary addressee of the support. Rather, the goal is to improve parenting behavior and parental investment by increasing the awareness of child development, and parents' attitudes and feelings towards the child. In this Symposium we present the four major RCT-studies on high-risk-family-supporting programs in Europe: "PFL Preparing For Life" (Orla Doyle, Ireland), "Pro Kind" (Tanja Jungmann, Germany), "Building Blocks" (Mike Robling, UK) and "PAT ñ Mit Eltern Lernen" (Andrea Lanfranchi, Switzerland). First results show that measures primarily focused on home visiting programs can have a positive impact on family environment, parental competences and child development.

Early prevention with the home visiting program "PAT" with a high-risk sample (ZEPPELIN-Study)

Quantitative methods,Student learning,At-risk students,Interdisciplinary,Early childhood education

Andrea Lanfranchi, University of Applied Sciences of Special Needs Education, Switzerland; Alex Neuhauser, University of Applied Sciences of Special Needs Education, Switzerland; Simone Schaub, University of Applied Sciences of Special Needs Education, Switzerland;

ZEPPELIN (Zurich Equity Prevention Project with Parents Participation and Integration) is an intervention study with two objectives: Firstly, interdisciplinary early detection of children jeopardized in their development for psychosocial reasons; secondly, intensive and case-related early support of these children in order to increase their long-term educational opportunities. Within the framework of a home-based and partially center-based approach, a qualified female specialist for child care of the counseling service for small children visits families from the target group at home, one to four times a month, and invites them to the monthly group meeting in the family center. The specialist applies the US-American program (adapted to Swiss standards) ÑPAT ñ Parents as teachersì for children from 0 to 3, to raise the parentsí awareness for the age-specific needs of their children, to prepare them for a close collaboration with the educational institutions and to give optimum support to the childrenís language development. In 2009-2011 ZEPPELIN has been implemented successfully as a feasibility study (ZEPPELIN/M) with 15 families. Since 2011 the main study is carried out with 252 families randomized into an intervention (132) and a control group (120) living in the agglomeration of Zurich. Preliminary results of the data collection for children age 12 and 24 months are promising. Children from multiply stressed families benefit the most in terms of language development. After 2 Ω program years the random sampling is still consistent (dropouts N=26, i.e. 4% per annum).

Gender-specific effects on child development and parental investments. Evidence from the project ìPro Kindî

Quantitative methods,Student learning,Developmental processes,Parental involvement in learning,Early childhood education

Tanja Jungmann, University of Rostock, Germany; Alex Neuhauser, University of Applied Sciences of Special Needs Education, Switzerland;

Home visiting is a prominent approach to support disadvantaged families. Meta-analyses and systematic reviews revealed significant but small positive program effects on parenting competencies and child development. Since we found no significant intervention effects on child development in the full sample (Sierau et al., in press), we examined gender specific developmental trajectories and program effectiveness on maternal investments in girls and boys. In a multi-centered, longitudinal randomized controlled trial (RCT), a total of 755 women at high psychosocial risk were recruited: 394 received home visits (treatment group), 361 were assigned to the control group. Program influences on parental investments (e.g., reading picture books, story telling) and child development (mental, psychomotor, language) were assessed at six, twelve and 24 months via self-reports and developmental tests. Econometric and multivariate analyses showed gender and domain specific effects of home visiting. Girls in the treatment group received higher scores in the MDI (BSID-II) than girls in the control group. We found the same gender specific effect for word and sentence production in the SETK-2. The effect sizes are small to moderate (d=.20 to d=.30). These findings are explained by higher parental investments in girls than in boys. The gender-specific effect of the home visiting program ìPro Kindî is in line with findings from reevaluations of other early childhood interventions, but still poorly understood. Our results call for gender specific modifications of program content to prevent the accumulation of developmental disadvantages for boys up to school age.

Preparing for Life: Assessing the impact of an early intervention programme at 24 months

Quantitative methods,At-risk students,Parental involvement in learning,Interdisciplinary,Early childhood education

Orla Doyle, University College Dublin, Ireland; Ailbhe Booth, UCD School of Psychology & UCD Geary Institute for Public Policy, Ireland;

Intervening early in a childís life has been shown to be effective from a biological and economic perspective. Early intervention can reduce socioeconomic disparities in children's development, yet the evidence base in restricted to a small number of US studies. This study investigates the impact of an Irish early intervention programme, Preparing for Life (PFL), from birth until 24 months using a randomized control trial design. Preparing for Life (PFL) aims to improve childrenís school readiness by working with disadvantaged families from pregnancy until school entry. Participants were randomly assigned to a treatment (n=115) or control group (n=118). Both groups received a number of common low-level supports, while the treatment group received a home visitation programme. Treatment was assessed across 8 domains: child development, child health, parenting, home environment, maternal health and wellbeing, social support, childcare, and household factors and socio-economic status. Treatment effects were found on 21% of outcomes (across 7/8 domains). For example treatment children showed lower incidence of asthma, stronger cognitive development, and treatment parents demonstrated less clinically significant parenting stress. The significant findings in child development and child health doubled compared to the results at 18 months. The findings suggest that early intervention can significantly improve child health and developmental outcomes. There is also some evidence that the programme raises the efficiency of parental investment by improving the quality of the home environment and parenting skills.

Assessing long-term outcomes of a home-visiting intervention for teenage mothers: BB 2-6

Quantitative methods,Developmental processes,Educational attainment,Parental involvement in learning,Early childhood education

Michael Robling, Cardiff University, United Kingdom;

Teenage mothers in the UK face individual, social and economic challenges in providing a successful start for their childrenís lives. There is evidence for both short and longer-term benefit from a home visiting programme (Family Nurse Partnership, FNP) delivered by specially trained nurses from trials in the United States. Our trial of FNP will report in 2015, but will only address impact up to the second birthday of the familiesí first child. The programmeís investment (up to 64 consultations over two years) has been most strongly justified over the longer term (i.e. to adulthood). We have established a data linkage model for securing longer term follow-up of participants in our original trial. This draws upon routinely collected data from health, social care and education sectors using anonymised linkage to match with existing trial data and a model of dissent rather than active consent. This linkage model is novel for the UK, offering the possibility for long term evaluation, at lower cost and with the potential to extend to other sectors (e.g. criminal justice). We will follow up children (and mothers) from the original trial until aged

six years old, and assess intervention impact upon health, social and educational outcomes with a particular emphasis upon maltreatment. The presentation will review the approach established in this on-going study, the challenges in establishing the model of data linkage, initial assessment of feasibility and data quality, and consider broader messages for social care and educational evaluations in the UK and in other European countries

N 13

29 August 2015 08:45 - 10:15

Room Brown_B7

Symposium

Learning in context

Chronotopes of learning and instruction: investigating space-time in educational research

Keywords: Emotion and cognition,Learning in context,Qualitative methods

Sig's: SIG 25 - Educational Theory

Chairperson: Peter David Renshaw, The University of Queensland, Australia

Organiser: Giuseppe Ritella, University of Helsinki, Italy

Organiser: Peter David Renshaw, The University of Queensland, Australia

Discussant: Rupert Wegerif, University of Exeter, United Kingdom

Recently researchers in education have found Bakhtin's chronotope (unity of space-time) relevant and insightful for researching issues in learning and instruction. There are many reasons to defend the thesis that we need theory and research on space-time relations in learning and instruction. First, the way students and teachers manage the space-time of learning practices is not an afterthought, but an integral part of their thinking and learning (Kirsh, 1995). Second, space-time frames in education are concrete manifestations of pedagogical regimes embedded in the everyday life of schools and classrooms (Matusov, 2009). It is within these routine time-space matrices that students and teachers need to exert their agency if they are to transform their environments and create authentic identities for themselves in dialogue with others (Brown & Renshaw, 2006). Third, the space and time of learning and instruction is radically changing with the advent of digital technology, with the huge variety of digital tools that enrich and transform the space-time frames of schooling. Taken together the papers in the symposium reveal the relevance of the chronotope for researching: (i) the fluid formal and informal contexts of online learning; (ii) the construction of a shared understanding of tasks and contexts in collaborative learning (iii) the policies and practices of high-stakes testing; and (iv) how normalized categories

of "us' and "them" are created in the diagnostic interview. The diversity of issues addressed in the symposium indicates the increasing relevance of chronotope as an analytical lens for researchers.

Building space-time frames in technology - Mediated collaborative learning tasks

Qualitative methods,Video analysis,Educational technology,Distributed cognition,Inquiry learning,Learning in context

Giuseppe Ritella, University of Helsinki, Italy; Kai Hakkarainen, University of Helsinki, Finland; Maria Beatrice Ligorio, University of Bari, Italy;

This study is aimed at investigating if and how the building of space-time frames is intertwined with the construction of a shared understanding of the task to be accomplished during a media design project course. We conducted participant observation at a media design course where students worked in groups of 4-5 to develop a project. We collected video and audio records of studentsí activity and qualitatively analyzed studentsí interaction when the link between negotiation of space-time relations (chronotope) and shared interpretation of the collaborative task is explicitly articulated in studentsí activity. Moreover, stimulated recall interviews were used to gather studentsí perspective on the investigated phenomena. The analysis shows that students/ interpretation of the task is a developmental process, interdependent with studentsí perception of the space-time relations of the ongoing activity. Often students discussed ñ and changed ñ their interpretation of the collaborative task in association with the discussion of the space-time organization of the activity. This investigation reveals how the meaning of tasks in CSCL emerges from a continuous (discursive) process of negotiation that concerns the whole context in which the activity take place, during which space-time relations are particularly relevant.

The chronotopes of studentsí chat interaction during creative collaborative writing

Conversation/ Discourse analysis,Cultural psychology,Educational technology,Social interaction,Writing/Literacy,Primary education

Kristiina Kumpulainen, University of Helsinki, Finland; Anna Mikkola, University of Helsinki, Finland; Antti Rajala, University of Helsinki, Finland;

This study examines how new digital tools shape the contextual grounding of studentsí chat interaction during technology-mediated collaborative writing in and out of school. It employs the concept of chronotope to focus on the transformation of the spatial and temporal configurations that constitute the contexts for the studentsí joint activity. The empirical data of this study derive from fifth and sixth grade (ages 11 to 12) students who worked with personal laptops and a collaborative writing service VisciPad at school and outside to collaborate on creating a school musical script for over a 3 month period. The studentsí online chat discussions and the revision history of the scripts were analyzed focusing on the distribution of the activity in space and time and to the construction of spatial and temporal contexts in the studentsí discourse. The results indicate significant engagement in collaborative writing activity also outside school. The study

demonstrates how multiple chronotopes representing both traditional and novel time-space configurations intersected in the studentsí joint activity. The students' collaborative writing was connected to and interacted with heterogeneous discourses and networks of activities of their formal and informal lives. The students engaged in various parallel discourses diverging from the actual writing task that enabled the sharing of emotions and their engagement as ëwhole personsí in the activity. The results show that social interactions that are usually regarded as off-task talk in research accounts of collaborative learning served important relational and emotional functions for the studentsí joint technology-mediated activity.

The testing chronotope in Australian schools: The emergence of reductive test-relevant identities

Qualitative methods,Educational policy,Educational attainment,Social interaction

Peter David Renshaw, The University of Queensland, Australia;

I draw upon Bakhtinís theory of the unity of space-time to describe the features and consequences of the ìtesting chronotopeî (t-chronotope) in Australian schooling (Renshaw, 2013). The t-chronotope organises the space-time of schooling according to the requirement of tests per se. Ontologically the t-chronotope privileges test relevant content and identities; in terms of epistemology it privileges test-relevant ways of knowing and study strategies; in terms of axiology, self-control, efficiency and maximising individual performance are privileged. In Australia the t-chronotope has been energised by NAPLAN, the policy of mandated national testing of literacy and numeracy for all students in Years 3, 5, 7 and 9. Since NAPLAN was introduced in 2008, the t-chronotope has taken hold within schools and homes in the formation of test-relevant identities for students, parents, teachers and principals. The t-chronotope has dramatically changed the pattern of time devoted to various curriculum domains; it has influenced time at home by pressuring parents to prepare their children for the tests; and it has redefined teachersí and principalsí professional competence as primarily test-related performance. Itís the professional reputation and continuing employment of teachers and principals that are at stake in the tests, so ìno pressure, kids.î The t-chronotope operates, however, in contested dialogue with other educational chronotopes that foreground caring pedagogical relationships, the formation of agentic selves, and more holistic development. In the interviews with teachers, students and parents we hear traces of this contesting chronotope in their reservations and concerns, and a call for alternative relational chronotopes in schooling.

Taking care with categories: Chronotoping Aspergerís Syndrome

Case studies,Conversation/ Discourse analysis,Qualitative methods,Special education,Learning and developmental difficulties

Kim G Davies, The University of Queensland, Australia;

This paper is a chronotopic reading of Aspergerís Syndrome, specifically the sociocultural and historical conditions that enabled its emergence as a diagnosis of choice in the global north in the late twentieth century. It will also analyse how this diagnostic chronotope was taken up and

realised in the transcript of a clinical interview resulting in the diagnosis of Aspergerís Syndrome. It uses Bakhtinís concepts of chronotope and answerability to trouble the diagnostic reflex (Harwood & Allen, 2014) typical of dominant classroom chronotopes in these testing times. If, as Bakhtin (1990) said, there is no alibi for being, what might happen to ëusí and ëthemí if we seek to answer the chronotopes at play in our everyday lives and practices as educators?

N 14

29 August 2015 08:45 - 10:15

Room Brown_B3

Symposium

Writing

Becoming Revisers of Text: Changing Practices and Perceptions

Keywords: Learning approaches,Literacy,Secondary education,Writing/Literacy

Sig's: SIG 12 - Writing

Chairperson: Susan Jones, University of Exeter, United Kingdom

Organiser: Susan Jones, University of Exeter, United Kingdom

Discussant: Elke Van Steendam, KU Leuven, Belgium

Revision is the process whereby writers edit and change text in line with rhetorical intention. Research has repeatedly shown that developing writers revise little and in ways that look more like proof-reading than refining for an authorial purpose, while expert writers revise more frequently, more deeply and in line with personal intention and audience needs. The symposium will consider how existing classroom practices might unwittingly be limiting a perception of revision as largely secretarial. The symposium will present revision as a complex concept. Firstly, writing is a cognitive process and development of revision is dependent on automation releasing cognitive capacity in what is a cognitively costly activity. Secondly, writing is a social practice and within classrooms young writers perceive approved written forms and preferred writing practices. Furthermore, assessment processes drive understandings of improvement and success. Within this context the process of revision raises questions such as; revising for what and revising for whom? Thirdly, writing is creative and personal and revision allows identity and authorial intention to be refined. This symposium will present the move from relative novice to expert and from observed behavioural revision patterns to voiced perceptions in order to explore how writers develop an understanding of what, how and why they might revise a written text

Revising and pausing in relation to syntactic development

Experimental studies,Literacy,Language (L1/Standard Language),Writing/Literacy,Secondary education

Victoria Johansson, Lund University, Sweden; Asa Wengelin, University of Gothenburg, Sweden; Pia Gustafsson, Lund University, Sweden;

The aim of this paper is to explore revision by recording how editing patterns develop with age and experience. The data consist of 135 expository texts, collected in an experimental setting, using key-logging that records the writing, including editing and pausing behaviour. The participants were divided into five age groups: 10-year-olds (n=20), 13-year-olds (n=20), 15-year-olds (n=20), 17-year-olds (n=20) and adult university students (n=55). A subgroup of the adults (n=16) consisted of ëexpertsí who worked with texts professionally. This investigation focusses on the 7 051 pauses which occurred in connection with editing, here defined as the use of delete, arrow keys or mouse. The ëediting pausesí were coded for grammatical context, preceding and following the pause. Findings reveal that several editings often occur together, and that this phenomenon increases with age and expertise. For all groups, editings occur to a great extent between sentences. However, writers from 17-year-olds and upwards, are more mobile, i.e. they are not solely concerned with editing the immediately written text, but the changes are being carried out on a more global text level. In the group of ëexpert adultsí, sometimes more than 40 % of the total writing time is devoted to editing the previously written text. The findings in this study show clearly that the editing behaviour develops far into adulthood. Educationally, this has implications for teaching methods on writing in general and on text editing in particular

Revising as Professional Practice: Professional Writersí Reflection on their Revising Processes

Qualitative methods,Literacy,Reflection,Writing/Literacy,Communities of practice

Debra Myhill, University of Exeter, United Kingdom;

Cognitive models of writing draw attention to reviewing, or revision, as one key component of the writing process, iteratively cycling with planning and text generation as the unfolding text develops. At the heart of revision lies the ability to detect or recognise where the text is not fulfilling the writerís rhetorical intentions, and there is general agreement that this process is ëcognitively costlyí. At the same time, research indicates that expert writers revise more, and more deeply, than novice writers, and in the classroom younger writers find it very hard to move beyond revising the surface features of text. Alternative perspectives on revision, drawn from creativity theory, highlight the importance of managing the critical and the creative during the writing process. This paper explores the revising processes of three categories of professional writers: poets and novelists; journalists; academic writers. An in-depth interview was conducted with each writer, exploring the choices they make whilst composing and their writer identity. The interview also used a piece of the authorís writing as a stimulus for discussion. The analysis indicates that revision is a key component in writing for all professional writers, but that it is differently realised by different writers. The paper will show how some of this variation cuts across the different categories of writers, whilst elsewhere the variation in revision practices correlates more strongly with professional category. The studyís findings are significant in

offering a challenge to common instructional practices which routinize revision in the classroom as a monolithic post hoc activity

ëWriting in tight spacesí: How school practices limit studentsí revising for meaning and purpose

Qualitative methods,Literacy,Language (L1/Standard Language),Writing/Literacy,Secondary education

Lucy Oliver, University of Exeter, United Kingdom;

Research over several decades suggests that school and college writers typically revise little and at superficial levels, thereby limiting the scope for improvement of their texts. The apparent failure of students to revise more substantively has been variously explained. On the one hand it is suggested that adolescent writers may lack the cognitive and metacognitive resources necessary for effective revision (Flower & Hayes, 1980; Bereiter & Scardamalia, 1987; Kellogg, 2008) and on the other that school models of composition may not adequately support critical reflection or reconceptualisation (Emig, 1971; Sommers, 1980; Yagelski, 1995). Identifying strategies for promoting more effective revision in the classroom remains problematic. This paper reports on a school-based study of secondary writersí perspectives and revising practices. Based on observations of writing, interviews and analysis of texts over the course of an extended writing task, the study explored studentsí understandings of the purpose and process of revising school writing, and the criteria by which they evaluated success. The findings suggest that whilst the revisions of writers of different abilities were indeed primarily superficial, students did not necessarily lack the understanding or capacity to revise more effectively. Able writers attributed their limited practice to tightly-prescribed tasks, assessment requirements and writing conditions. They were also hampered by a dichotomous view of the choices available to them which caused them to set unnecessary parameters on their revising behaviours. These findings have important implications for educational policy and practice

ìWhatever youíve learned, put it all inî: How teenagersí ideas of quality inform text revision

Qualitative methods,Literacy,Language (L1/Standard Language),Writing/Literacy,Secondary education

Helen Lines, University of Exeter, United Kingdom;

Revision aims to ëimproveí what is written. If an educational goal is the improvement of writing, then we must be able to evaluate the quality of the written product. There is recognition that ìidentifying what constitutes good writingî is crucial ìbut remains a challenge for teachers and researchers alikeî Graham at al. (2012). Writing quality is a complex construct, difficult to delineate in any meaningful generic way in order to promote shared understanding with students. Even when criteria are published as explicit frameworks or rubrics, they do not equate directly with standards (Sadler, 1989) and require interpretation, which is a subjective and intersubjective process (Beck, 2006), shaped by context and by the knowledge and beliefs of interpreters within

a community of practice. Despite the prominence of self- and peer-assessment in UK secondary schools, there has been surprisingly little investigation of childrenís evaluative skills. Utilising lesson observation and interview data from 32 schools, this paper reports on twelve-year old studentsí conceptualisations of good writing, and how these might inform beliefs about improving writing. These young writers used a rich and diverse range of both personal and published criteria to characterise quality and demonstrated a strong awareness of writing for impact on an audience, with peer response especially valued. However, studentsí strategies for improving writing were often difficult to articulate, formulaic and generalised, or circumscribed by limited linguistic subject knowledge, casting doubt on their ability to act on writing targets.

N 15

29 August 2015 08:45 - 10:15

Room Green_A2

Symposium

Early childhood education

Approaches to assessing science content knowledge and science process skills in young children

Keywords: Assessment methods and tools,Competencies,Early childhood education,Inquiry learning,Quantitative methods,Science education

Sig's: SIG 3 - Conceptual Change

Chairperson: Mirjam Steffensky, Leibniz Institute of Science and Mathematics Education (IPN), Germany

Organiser: Miriam Leuchter, University of Munster, Germany

Discussant: Andrew Tolmie, University of London, United Kingdom

Science education aims at developing children's scientific literacy, targeting their interest in science, science content knowledge, and procedures. According to constructivist views of learning, the recognition of children's na?ve understanding of science phenomena is a main prerequisite for successful science education. Core aspects comprise a) knowledge structures in different content domains, b) process knowledge (such as observing, exploring, comparing, designing experiments and developing conclusions on the analysis of data) as well as c) the coherence between content knowledge and process skills. Methodologically, approaches to assessment of young children's knowledge may incorporate interview settings, use of hands-on tasks and material, and authentic science settings. In the symposium, different approaches to assessment will be presented with a focus on content domains appropriate for early science learning contexts. Further, implications for supporting the development of scientific knowledge

will be addressed. The first of the presented studies focuses young children's structure of knowledge developing from preschool to primary school in different content domains such as melting/freezing, condensation/evaporation.The second study focuses on instruments assessing preschool children's process skills and examines the relationship between these skills and conceptual knowledge.The third study investigates preschool children's consideration of the control of variables strategy (CVS) during the design of experiments in different domains and its relationship to content knowledge.The last study examines preschool children's exploratory behavior, assessed with the Exploratory Behavior Scale, in a museum setting using an experimental paradigm and identifies adult's effective explanation types.

Conceptual Scientific knowledge from Preschool Children and Elementary School Children (1st grade)

Quantitative methods,Student learning,Competencies,Science education,Early childhood education,Inquiry learning

Mirjam Steffensky, Leibniz Institute of Science and Mathematics Education (IPN), Germany; Claus H. Carstensen, University of Bamberg, Germany; Eva-Maria Lankes, Technische Universitat Munchen (TUM), Germany;

Recent studies show that preschool children are able to develop scientific knowledge in different content areas (Carey, 2009; Gopnik & Schulz, 2007; Samarapungavan, Mantzicopoulos & Patrick, 2008). Knowledge refers here not only to scientific concepts, but also to everyday concepts (Schneider & Hardy, 2013). Little is known about the structure and characteristics of science-specific conceptual knowledge, about relationships between different content areas, and about conceptual development in this early age. In this presentation we will focus on the conceptual knowledge of Preschoolers (n=253) in the content area of melting and freezing, of condensation and vaporizing, and of chemical solutions and compare it with the conceptual knowledge of children from first grade of elementary school (n=85). Knowledge in both groups was assessed with a tests implemented as structured interview. The tests consist of 32 items including multiple choice, open response, true/false items and picture selection items. As expected the older children score significantly higher on the test in all three content areas (T(336) =-12,144, p=.000, d= 1.52). Results of item difficulties across the two groups of children indicate that the older children have less difficulties to answer items correctly which are less contextualized. In this presentation we will report in detail about the knowledge of the preschoolers and compare item difficulty within both groups.

Assessing science skills in preschool: Relationships between process and domain-specific knowledge

Quantitative methods,Student learning,Competencies,Science education,Early childhood education,Inquiry learning

Tobias Ziegler, Goethe-Universitat Frankfurt, Germany; Ilonca Hardy, Goethe-Universitat Frankfurt, Germany; Paivi H. Taskinen, Friedrich Schiller University Jena, Germany; Miriam

Leuchter, University of Munster, Germany; Mirjam Steffensky, Leibniz Institute of Science and Mathematics Education (IPN), Germany;

In different studies, evidence has been accumulated that preschool children are able to apply certain processes of scientific inquiry when reasoning within science contexts. For example, different studies show that children are able to differentiate between theory and evidence under certain conditions, a prerequisite for further processes of scientific inquiry. However, the relationship between conceptual knowledge and theses process skills has rarely been investigated. This study therefore focuses on aspects of scientific literacy and their interrelations in young children of preschool age: To what extent may young childrenís competencies in the area of process skills be assessed reliably? Of what nature is the relationship between process skills and conceptual knowledge in young children? In a series of pilot studies, we constructed and tested instruments for scientific reasoning and domain-specific conceptual understanding with a total of 157 children and overall good reliabilities. In co-administered instruments, we found a medium correlation of scientific reasoning and domain-specific conceptual understanding with Pearsons/r = .54 ($p < .05$; $N = 27$), pointing to the relevance of conceptual knowledge in process skills. In the main study, these results will be extended to a sample of 300 preschool children, allowing us to investigate further the distinct contribution of domain knowledge to scientific reasoning.

Coherence between science content and process knowledge in preschool age

Quantitative methods,Student learning,Competencies,Science education,Early childhood education,Inquiry learning

Miriam Leuchter, University of Munster, Germany; Marina Ape, University of Munster, Germany; Julia Stipp, Westfalische Wilhelms-Universitat, Germany;

Early science education aims at fostering content as well as process knowledge. Process knowledge such as the Control of Variables Strategy (CVS) must be applied to obtain meaningful experimental results. Moreover, adequate content knowledge can support but also hinder the application of the CVS: while designing an experiment, children may draw on content-related presuppositions, e. g. ethical beliefs regarding living things, rather than on the CVS. Thus, one can assume that the difference between living and non-living things may be an issue concerning the application of the CVS (e. g. content ìplant growthî vs. ìball runì). However, the relationship between content and process knowledge has rarely been investigated in preschool children. The present study investigates 59 childrenís (M=6.67 years; SD=.32) use of the CVS as well as content knowledge across four different content domains which presumably vary regarding childrenís content and ethical knowledge: ìball runì, ìfloating and sinkingì, ìfrictionì and ìplant growthî. Each child was categorized within each content domain as a) applying CVS, b) maintaining the critical variable constant or c) guessing. Results show that the children apply the CVS comparably in the contents ìball runì, ìfloating and sinkingì and ìfrictionì despite major differences in their content knowledge. Regarding the content ìplant growthî, however, the majority of the children maintain the critical variable ìwaterî constant. The results suggest that the application of the CVS is independent from content knowledge as long as ethical aspects do not matter.

The effect of adult explanation on preschoolersí exploratory behavior in a museum setting

Quantitative methods,Student learning,Competencies,Science education,Early childhood education,Inquiry learning

Tessa van Schijndel, University of Amsterdam, Netherlands; Maartje Raijmakers, University of Amsterdam, Netherlands;

Preschoolers nowadays are visible in science museums, but the age group is still underrepresented in visitor research. Exploration is central to preschoolersí science learning (e.g. Gelman & Brenneman, 2004), and in museums this behavior is usually guided intensively by adults. Therefore, an important question is how to optimize this process. Fender and Crowley (2007) investigated the relation between causal explanations and preschoolersí exploration. However, besides causal explanations, other explanation types exist, such as open questions and evidence descriptions (e.g. Crowley et al., 2001). Previously, we investigated relations between these different explanation types and preschoolersí exploration (Van Schijndel & Raijmakers, submitted). We found a positive relationship between parentsí evidence descriptions and preschoolersí exploration. Evidence descriptions are comments on exhibit features and results of childrenís manipulations. The present study aimed replicating this correlational result with an experimental paradigm. Preschoolers explored two exhibits, while being guided by a test-leader performing the evidence description, open question or minimal coaching style. Childrenís exploration was assessed with the Exploratory Behavior Scale (e.g. Van Schijndel et al., 2010). The results showed that describing evidence was equally or more effective in guiding childrenís exploration than asking open questions. However, the effectiveness of the styles depended on the exhibit. As the ability to focus attention to relevant task aspects is developing in childhood, evidence descriptions might provide structure to childrenís exploration. Given the central role of exploration in museum visits, and the relative ease of describing evidence, this is a relevant result for the practice of informal science learning.

N 16

29 August 2015 08:45 - 10:15

Room Blue2_D2

Symposium

Teacher professional development

Responsible teaching: How to deal with and prepare for diversity?

Keywords: Achievement,Cultural diversity in school,Emotion and cognition,Interdisciplinary,Morality

Sig's: SIG 13 - Moral and Democratic Education

Chairperson: Claudia Krille, Goethe-Universitat Frankfurt, Germany

Organiser: Karin Heinrichs, Goethe-Universitat Frankfurt, Germany

Discussant: Karin Heinrichs, Goethe-Universitat Frankfurt, Germany

Teachers are challenged to get aware of the students' needs, prior knowledge, motivations or emotions or backgrounds in order to create learning environments which allow managing diversity appropriately. This session brings together four papers referring to different approaches, but all assuming that responsible teaching in particular means to develop learning environments which aim to deal with diversity by getting aware of students' emotions and needs. Thus, this symposium intends to cross borders of research traditions and to encourage an enriching discussion. Paper 1 highlights that immigrant and non-immigrant students differ in achievement emotions and discusses consequences for dealing with social diversity in the classroom. Paper 2 is based on the assumption that the feeling to be taken seriously impacts on learning outcomes in general and among underachievers, in particular. The results show that to create learning environments where the students of heterogeneous levels of performance feel taken seriously, it plays an important role to manage time effectively. Paper 3 is based on action research. It explicates the teacher' role to offer opportunities to students and teachers to experience, reflect and getting aware of the learners' abilities and limits, emotions and fragilities: to create learning environments which allow to recognize and endorse students' differences and to foster learning inclusively. Paper 4 assumes that the neurobiological approach (Triune ethics theory) is fruitful to foster basic cognitive and emotional conditions for value education and for getting individuals and society prepared for religious diversity.

Emotional competence in the school: Invariance of achievement emotions across immigrant status

Quantitative methods,Cultural diversity in school,Achievement,Emotion and cognition,Motivation and emotion

Daniela Raccanello, University of Verona, Italy; Margherita Brondino, University Verona, Italy;

The emotional processes involved in the integration of culturally diverse children are of primary relevance from both theoretical and applied perspectives, also in light of the steadily increasing presence of students of different citizenships within the class, at least in the Italian schools. Our main aim was to explore the relationships between three different components of emotional competence, namely expression of achievement emotions, understanding, and regulation of emotions (Denham, 1998; Pekrun, 2006; Pekrun & Stephens, 2012), focusing on specific contexts (Italian and mathematics domain, class and test setting), in immigrant and non-immigrant elementary school students. We involved 166 immigrant and native first-, third-, and fifth-graders. We administered three instruments to measure expression of achievement emotions (Pekrun, 2006; Pekrun & Stephens, 2012), emotion understanding (TEC, Test of Emotion Comprehension, Pons & Harris, 2000), and emotion regulation (ERC, Emotion Regulation Checklist, Shields & Cicchetti, 2001). First, through multi-group analyses we verified the validity of the dimensionalityñin terms of higher salience of domain versus settingñof most of

the achievement emotions across immigrant status. Second, through path analyses we tested a model in which emotional understanding and regulation abilities predicted achievement emotions. Third, through multi-group analyses we documented how the relationships of such models varied across immigrant status. Notwithstanding limitations, these findings are a first step towards a better understanding of immigrant studentsí emotional life. Such knowledge could help to favour processes of integration in the school, based on the awareness of the key role played by emotions.

When do underachievers feel taken seriously? ñ Creating ìquality timeî

Mixed-method research,Achievement,Emotion and cognition,Learning and developmental difficulties

Kristina Kogler, x, Germany; Tobias Kaerner, University of Bamberg, Germany;

Dealing with diversity in education plays an important role for studentsí learning success. Especially in school it is of particular relevance how many learning opportunities are generated during class. In a certain way diversity calls for a strategic use of instructional time and a reasonable distribution of learning opportunities, especially if teachers are confronted with ability-achievement-discrepancies such as underachievement. Furthermore, against the background of emotion theories it is important to know about studentsí experiences during class ñ whether they feel taken seriously, whether they have enough time to reflect on subject matters and whether they are challenged in an adequate way. As many studies concerning learning emotions focus on retrospective questionnaires it seems promising to explore studentsí subjective experiences during class using experience sampling procedures. Within a video study in a Bavarian business school 84 students were investigated during altogether 32 accounting lessons. Besides measuring personal initial conditions by questionnaires and a knowledge test, during class we measured studentsí states in equally spaced intervals by using Continuous State Sampling. Analysing the influence of several parameters on the feeling of being taken seriously we carried out a multilevel model. By controlling for gender and age, the findings show that sufficient time slots to reflect on subject matter and a strategic use of instructional time significantly affect the feeling of being taken seriously. Wasted time periods meanwhile affect experienced appreciation significantly negative. But above all we found a significant interaction between ability-achievement-discrepancy and participation in classroom talk concerning perceived esteem.

Managing diversity in the classroom - Reflections from action research

Action research,Qualitative methods,Teacher professional development,Teaching/instruction,Morality

Laura Selmo, Universita degli Studi di Milano-Bicocca, Italy; Cristina Palmieri, University of Milan Bicocca, Italy;

Teaching and learning are practices that occur in the complex ecologies of individual, social, cultural settings and contexts. The ìcoreî of job of responsible teacher is to create learning

environments where students and teachers experience a positive atmosphere. The students can develop their capabilities via experiences and reflection. Thereby emotions play and important role. This paper describes an action research on teacherís role and the construction of positive learning environments and highlights some fundamental conditions for responsible teaching. The study involves teachers from different schools: infant, primary and secondary and its main aim is to build methods able to support the learning process of each students through teachersí reflection practices.

Triune Ethics Theory, Values Education Practice and Religious Diversity

Teacher professional development,Morality,Religious studies,Values education

Terence Lovat, The University of Newcastle, Australia; Daniel Fleming, Broken Bay Institute/University of Newcastle, Australia;

The paper will firstly apply Narvaezís Triune Ethics Theory to the issue of religious diversity, aiming to provide a firmer moral conceptual base to dealing with this relatively new, challenging and increasingly sensitive feature of twenty-first century societies. Attention will be focused especially on the notion of imaginative ethics/mindset to show that interfaith engagement can impel both vicious and communally-orientated imagination, leading in turn to very different results. We believe this explains the dual effect to be found in many religiously diverse societies, characterized as they are by both positive and negative interfaith encounters. The paper will secondly employ data generated from projects in the Australian Values Education Program (2004-2010) that targeted religiously diverse settings to show that religious diversity can be the grounds for bringing out the best and worst of human responses and that, importantly for moral education, steering human responses towards the positive is within the bounds of well-conceived pedagogical practice in schools.

N 17

29 August 2015 08:45 - 10:15

Room Cyan_F1

Symposium

Teacher professional development

Professional teacher competencies: Development and influencing factors

Keywords: Competencies,Teacher professional development,Teaching/instruction

Sig's: SIG 11 - Teaching and Teacher Education

Chairperson: Britta Oerke, TU Dortmund University, Germany

Organiser: Britta Oerke, TU Dortmund University, Germany

Organiser: Nele McElvany, TU Dortmund University, Germany

Discussant: Tina Hascher, University of Bern, Switzerland

Professional competencies of teachers were shown to be crucial for teacher effectiveness, instructional quality and student learning. The present symposium includes a number of important competencies like knowledge, diagnostic competencies, beliefs, motivational orientations and self-regulation. It focuses on their development, important predictors and interactions with other competencies. The first two presentations examine the development of knowledge and self-regulation during teacher education. In the first contribution, the development of mathematics content knowledge and pedagogical content knowledge are analyzed. The authors identified differences between school types and impact of other competencies like motivational orientations. The second talk deals with the stability of student teachers? self-regulation behavioral styles defined by resilience and engagement. A high stability of behavioral style was found and no differences between student teachers and other students occurred. The following two papers focus on teacher characteristics as impact factors on different competencies. In the third contribution, the impact of student and teacher gender on the evaluation of student ability was analyzed. Same-gender evaluations were not more positive than opposite-gender evaluations, but girls were rated more positively than boys in first-language. Finally, the influence of teacher characteristics on teachers? attitudes and motivational orientations in the field of text-picture integration was examined. The outcomes demonstrate the importance of school type and teaching experience. Attitudes and motivation were shown to predict qualitative and quantitative instructional behavior. The findings contribute to a better understanding of the development of teacher competencies and their relationship to teacher characteristics. They have implications for teacher education and practice.

Developing Professional Knowledge in Mathematics during Teacher Education and Teaching Practice

Pre-service teacher education,Teacher professional development,Teaching/instruction,Competencies,Mathematics

Christian Bruehwiler, University of Teacher Education St.Gallen, Switzerland; Benita Affolter, Pedagogical University of St. Gallen, Switzerland; Lena Hollenstein, Pedagogical University of St. Gallen, Switzerland;

Teachers' professional knowledge is crucial for effective academic learning processes. Consequently, it is highly relevant whether and how teacher education contributes to the development of mathematics content knowledge (MCK) and mathematics pedagogical content knowledge (MPCK). Based on the project "Outcomes of Teacher Education" (German translation: Wirkungen der Lehrerbildung, WiL), a Swiss extension of the international comparative study TEDS-M, this paper investigates how MCK and MPCK develop during initial teacher education and the first years of teaching. For this longitudinal study, data (MCK and MCPK) was collected (1) at the beginning, (2) at the end, and (3) three years after teacher

education. The sample comprises 149 (future) primary and secondary teachers in Switzerland. Results for future primary teachers show a significant increase in MPCK during initial teacher education, but no significant changes in MCK. Results are different for future secondary teachers where a significant knowledge gain is found for MCK and MPCK. Prior mathematical knowledge is a significant predictor of later MCK and MPCK in both groups. Primary teachers show a significant loss of MCK from the end of teacher training to the third year in the profession, MPCK remains stable. The results validate findings from cross-sectional studies with cohorts in different years of teacher education. The findings will be discussed with respect to how teacher education and teacher induction could be improved.

Student gender impacts teachersí diagnostic competence

Teacher professional development,Teaching/instruction,Competencies,Language (L1/Standard Language)

Katarina Krkovic, EMACS, Luxembourg; Maida Mustafic, University of Luxembourg, Luxembourg; Samuel Greiff, University of Luxembourg, Luxembourg; Sirkku Kupiainen, University of Helsinki, Finland; Mari-Pauliina Vainikainen, University of Helsinki, Finland; Jarkko Hautamaki, Helsinki University, Finland;

To ensure a fair and equal educational system the understanding of possible biases in teachersí diagnostic competence is central. In the current study, we examined gender as a potential bias. Concretely, we tested the hypothesis that teachersí subjective evaluations of same-gender students, as compared to opposite-gender students, would be more positive, independent of studentsí objective ability. The results of multilevel analyses (Nstudents = 1974; Nteachers = 188) controlling for studentsí objective ability level revealed that neither teachersí gender nor the teacher-student gender interaction affected teachersí evaluations of student ability. However, studentsí gender had an effect on teachersí evaluations, as teachers rated girlsí first-language (Finnish) ability and potential for success in school higher than boysí. According to our findings, it is likely that student gender is a source of bias in teachersí evaluations of student ability.

Teachers' attitudes, motivation and instruction towards text-picture integration

Teacher professional development,Teaching/instruction,Attitudes and beliefs,Competencies,Self-efficacy

Britta Oerke, TU Dortmund University, Germany; Nele McElvany, TU Dortmund University, Germany; Annika Ohle, TU Dortmund, Germany; Holger Horz, Goethe-University Frankfurt, Institute of Psychology, Germany; Mark Ullrich, Goethe University Frankfurt, Germany;

Comprehension of instructional pictures is very important for student learning, but teachers are not trained in how to teach with these materials. In the present study, a sample of 226 primary and secondary school teachers was analyzed concerning their attitudes, motivation and self-efficacy towards teaching with instructional pictures. In a complex path model, these teacher competencies were related to background variables like gender, type of school and teaching experience on the one hand and were used to predict instructional quantity and quality on the

other hand. Small to moderate relations were found, explaining quarter of instructional variance. Possible reasons for the impact of different teacher background variables and practical implications are discussed.

Development of Teachersí Self-Regulation during University Education

Pre-service teacher education,Teacher professional development,Teaching/instruction,Competencies,Self-regulation

Janina Roloff Henoch, Leibniz Insitute for Science and Mathematics Education , Germany; Oliver Luedtke, IPN - Leibniz Institute for Science and Mathematics Education, Germany; Ulrich Trautwein, Institute of Education, Germany; Uta Klusmann, Leibniz Institute for Science and Mathematics Education (IPN) , Germany;

Occupational self-regulation is a central aspect of teachersí professional competence. Empirical work showed that occupational self-regulation positively effects teachersí well-being and their instructional quality. Suited in a model of competence, the assumption of competence to be learnable and malleable should also apply for self-regulation. This has not yet been investigated. The present work investigates the development of occupational self-regulation from the first phase of teacher education at the university in a period of four years. The present research used data from 1,858 students, including 264 teacher students, who took part in the longitudinal study TOSCA. Using a person-centered approach, the expected structure of occupational self-regulation was confirmed for university students through latent profile analyses. Results of latent transition analyses showed only slight individual development in self-regulation. Thereby, teacher students showed similar developments compared to other students.

N 18

29 August 2015 08:45 - 10:15

Room Orange_E1

Symposium

Instructional design

Information literacy instruction

Keywords: Comprehension of text and graphics,Instructional design,Literacy,Problem solving

Sig's: SIG 6 - Instructional Design

Chairperson: Halszka Maria Jarodzka, Open University, Netherlands

Organiser: Saskia Brand-Gruwel, Open University, Netherlands

Organiser: Manoli Pifarre Turmo, University of Lleida, Spain

Discussant: Liesbeth Kester, Utrecht University, Netherlands

Research on information literacy primarily focused on how students search for information on Internet. Nowadays the necessity of instruction in information literacy is acknowledged and research emerged focusing on how information literacy can be fostered (Brand-Gruwel & Gerjets, 2008). Different instructional design principles are used to design programs for all kinds of students. The symposium reflects upon different instructional interventions and the effects on students' information literacy skills. Salmer?n, Llorens and Fajardo discuss eye-movements modeling examples to foster secondary school students' online reading strategies in hypertext. Raes and Schellens will go into the regulatory processes that come into play during collaborative IPS and present finding on the use of collaboration scripts. Manoli and Argelagos will discuss the effects of a longitudinal study in which students from secondary education followed a three-year lasting curriculum on information literacy. Frerejean and Brand-Gruwel will go into the effect of the use of modeling examples on students' information literacy skills. Finally, the discussant, Prof. dr. Liesbeth Kester, elaborates on how instruction best can be designed to foster information literacy and what conclusions can be drawn for future research Brand-Gruwel, S., & Gerjets, P. (Eds.). (2008). Instructional support for enhancing students' information problem solving ability [Special issue]. Computers in Human Behavior, 24(3).

Using eye-movement video modeling to train hypertext navigation strategies: A pilot study

Experimental studies,Instructional design,Literacy,Writing/Literacy,Secondary education,Multimedia learning

Ladislao Salmeron, University of Valencia, Spain; Cristina Llorens, university of valencia, Spain; Inmaculada Fajardo, university of valencia, Spain;

Students are frequently confronted with complex hypertexts, such as Wikipedia, to search for and locate information for learning purposes. The navigational complexity of such hypertexts make them particularly challenging for children. In a pilot study we tested the usefulness of eye-movements modeling examples (EMMEs) to foster secondary school studentsí (N=20) online reading strategies in hypertext. Participants saw EMMEs displaying students using three main navigation strategies: planning, predicting and monitoring. Participants worked in dyads to discuss the strategies used in the EMMEs. Results indicate that an instructional program combining EMMEs with contrasting-cases is be useful to foster secondary school studentsí declarative knowledge of strategies to read on hypertext. These conclusions will be qualified by a future study planned for November-December 2014 in which we plan to use a control group and additional measures of strategy use (including a pre-test navigation task and a transfer post-test navigation task).

Supporting Shared Regulation during Collaborative Information Problem Solving on the Web

Experimental studies,Instructional design,Literacy,Secondary education

Annelies Raes, Ghent University, Belgium; Tammy Schellens, Ghent University, Belgium;

When implementing web-based inquiry projects in authentic classroom settings, collaboration is recommended since it has been found that student dyads are generally better in applying (information) problem solving (IPS) strategies, such as planning, monitoring and evaluating, and yield higher learning outcomes compared to students who work individually. Yet, successful collaboration and shared regulation is not guaranteed and may be hampered due to imbalances in participation in the group. This study aimed to investigate the regulatory processes that come into play during collaborative IPS and to find out if these processes can be supported by providing students with a collaboration script. The web-based project was implemented in 12 secondary school classes involving 202 students working in pairs. Six classes were provided with a collaboration script embedded in the learning environment, while the other six classes acted as the control group. Results based on quantitative as well as qualitative analyses confirm that shared regulation leads to better knowledge co-construction, yet no strong evidence is found for the hypothesis that a collaboration script support the regulative processes during joint IPS. However, this study confirms that overall, web-based collaborative inquiry improve studentsí individual IPS skills. Results will be discussed concerning their theoretical relevance and practical implications regarding the instructional design of support for collaborative IPS on the web in face-to-face classroom settings.

Longitudinal analysis of the effect of instructional support on studentsí IPS Skills and Performance

Experimental studies,Instructional design,Literacy,Problem solving,Secondary education

Manoli Pifarre Turmo, University of Lleida, Spain; Esther Argelagos, University of Lleida, Spain;

The purpose of this empirical study is to investigate the effects of a three-year long Information Problem Solving Skills (IPS) instruction on studentsí development of IPS and on studentsí performance in solving complex digital problems. The study was a quasi-experimental and longitudinal follow-up design in which sixty-one secondary students (12 to 16th years old) completed the four ad hoc tests that where took at different time points during the three-year project. All the students were tested in their regular classrooms. The main findings of our study showed that scores of task performance were statistically better in experimental students than those obtained by control group students along the project. Besides, the outperformance of experimental group students is higher in those tasks in which students had to use IPS skills to: a) deeply process web information; b) comprehend web information and c) organise and present web information in a personal and argumentative manner. Our findings also suggested that experimental students showed a more expert pattern than the control students regarding the IPS used. Educational implications will be discussed.

Effects of modeling examples on studentsí information literacy skills

Experimental studies,Instructional design,Literacy,Higher education

Saskia Brand-Gruwel, Open University, Netherlands; Jimmy Frerejean, Open University of the Netherlands, Netherlands; Paul A. Kirschner, Open Universiteit, Netherlands;

Solving complex information problems (also known as information literacy) requires a set of interrelated complex cognitive skills, but research shows that students of all ages display shortcomings in all of the steps of this information literacy process. These findings indicate a need for empirically tested instructional methods for fostering information problem solving skills. The current study follows up on previous work and investigates the effectiveness of modeling examples for teaching information problem solving skills in a short online training. In a first study (n = 39), results showed a statistically significant larger increase in posttest scores in the group of students that watched a modeling example, when compared to the group of students who received a practice task. In a replication study (n = 60) that included an extended pretest and posttest and a delayed posttest, no significant differences were detected. The answer to the research question therefore remains inconclusive, and a deeper investigation of the data is warranted.

N 19

29 August 2015 08:45 - 10:15

Room Green_A3

Symposium

Teacher professional development

Lesson Study: Setting the Scene for Teachers' Professional Development for Inclusive Teaching

Keywords: Communities of learners,Cooperative/collaborative learning,Learning disabilities,Teacher professional development

Sig's: SIG 11 - Teaching and Teacher Education

Chairperson: Sui Lin Goei, Windesheim University of Applied Sciences, Netherlands

Organiser: Sui Lin Goei, Windesheim University of Applied Sciences, Netherlands

Discussant: Rosanne Zwart, Utrecht University, Netherlands

Lesson study is a collaboration-based teacher professional development approach that originated in Japan. Teachers collaboratively engage in research inside their classrooms using a design cycle: prepare and design lessons, perform the designed lesson live as a research lesson and evaluate them in order to feed into the next cycle. Great thought is devoted to predicting how the students may react based on the teaching behavior of the teacher. What sets Lesson Study apart from other professional development methods is the live research lesson, creating a unique

learning opportunity for teachers. Lesson Study has hardly been explored on its effectiveness for teachers' professional development; effects are mostly reported based on self-reports. In this symposium, four studies are presented in which we narrate how teachers' professional development for inclusive teaching is enhanced by use of Lesson Study. The four studies target different inclusive teaching behaviors, educational settings, and pupils, varying from discerning educational needs within mathematics education, activating teaching behavior, teaching pupils with moderate learning difficulties to teaching and assessing pupils with high functioning autism. All cases are set in inclusive settings within regular education, making it imperative for the teachers to develop skills for adaptive and pro-active teaching in order to meet a variety of students' needs. In each study the question whether Lesson Study sets the scene for teachers' professional development for inclusive teaching is addressed. In the discussion, we will also go into the various contextual factors critical if Lesson Study is to become a sustained commitment in schools.

The learning teacher in a collaborative lesson study team within the context of mathematics

Case studies,Qualitative methods,Teacher professional development,Mathematics,Secondary education

Sui Lin Goei, Windesheim University of Applied Sciences, Netherlands; Nellie Verhoef, University of Twente, Netherlands;

This paper summarises results of two studies on teachersí learning when participating in a collaborative Lesson Study team within the context of mathematics teaching. In study one, Lesson Study was used in the classic way of preparing, designing, executing and reflecting on the research lesson. Teachers wondered about the counting problems of their students and focused within the design of lessons on studentsí reasoning. In study 2 participating teachers wanted to know how they could instruct algebraic equations to their students in such a way that the instruction meets the educational needs of the students. Within this Lesson Study cycle we used the concept of case pupils was used as the focus of lesson planning. In study 1 data were gathered using learner reports. In study 2 lesson plans were gathered and analysed and interviews with the teachers were conducted. The findings suggest beneficial outcomes for teachers. Lesson Study is an excellent model for constructing pedagogical content knowledge and improving teaching as the teacher becomes more knowledgeable about how the student learns and thinks and how instruction affects the studentís learning in the process of teaching as well as knowledge of the subject matter.

Does Lesson Study foster activating teaching behavior?

Case studies,In-service teacher education,Pre-service teacher education,Teacher professional development,Mathematics

Siebrich De Vries, University of Groningen, Netherlands; Gerrit Roorda, University of Groningen, Netherlands;

Activating teaching is problematic for a great deal of teachers in Dutch secondary education. Particularly, less experienced teachers should need professional development in this domain. In the context of a Professional Learning Community (PLC) for both less and more experienced teachers of mathematics, the professionalization method of the Lesson study has been chosen to foster activating teaching behavior. To investigate the effectiveness of this method, observations, pupils questionnaires and interviews are used. To measure activating teaching behavior a two dimensional instrument has been constructed with at the one hand indicators measuring pupilsí active participation in mathematics lessons, and on the other indicators measuring the cognitive demand of mathematical activities in the lessons. Preliminary results indicate that the differences in activating teaching behavior between less experienced and more experienced teachers are indeed notable. Less experienced teacher appear to have more room for improvement in their activating teaching behavior than highly experienced teachers. During the current school year, teachers are participating in two cycles of Lesson study, and changes in activating teaching behavior will be measured for both groups of teachers. In this way, the value of Lesson study for less experienced and more experienced teachers will be determined, which could have important implications for educational and professionalization practices in the Netherlands.

Lesson Study and teaching pupils with Learning Difficulties

Design based research,Mixed-method research,In-service teacher education,Teacher professional development,Learning disabilities,Secondary education

Brahm Norwich, University of Exeter, United Kingdom; Pete Dudley, University of Leicester, United Kingdom; Annamari Ylonen, University of Cambridge, United Kingdom;

This paper summarises a programme of design-based research used to develop and evaluate the use of a UK version of Lesson Study (LS) to enhance the teaching and assessing of pupils with moderate learning difficulties (MLD). In part one, LS was used in a two phase trial to develop the subject teaching of 91 secondary age pupils with MLD in inclusive settings by about 40 LS teams. In part two a smaller scale trial was conducted using LS for assessment (LSfa) purposes by 6 teams across 3 primary and 3 secondary schools. The results of part 1 led to the refinement of the LS methods based on the evaluation of the contexts, processes and outcomes of the Lesson Studies undertaken over the two phases. These findings suggest beneficial outcomes for pupils and teachers while outcomes for schools remain more complex. The study shows that various contextual factors are critical if LS is to become a sustained commitment in schools. The results from part 2 led to changes in the LSfA procedures based on the evaluation analysis. This also showed positive teacher outcomes and an understanding of the LSfA processes that support these outcomes. Some of the context factors that supported and inhibited the process are also outlined. Analysis of the pre-post LSfA pupil assessments showed how pupil assessments changed in a way consistent with a dynamic or response to teaching model of assessment. The paper concludes with analysis of this model of LS and future prospects for research.

Learning Study: Teachersí Professional Development in Assessing Students with Autism

Case studies,Design based research,Qualitative methods,Teacher professional development,At-risk students

Mona Holmqvist Olander, University of Gothenborg, Sweden;

The aim of this paper is to describe and analyze a Learning Study (LeaS) process of teachers working in an inclusive setting in a secondary school, to develop learning for students with high-functioning Autism or Asperger Syndrome (HFA/AS). The participating teachersí question was how field independent and field dependent cognitive styles impact studentsí ability to answer written questions in tests for assessment. Participants were students in grades 7 to 9 (n=11) and their teachers (n=5). The 11 adolescents (4 female and 7 male) were aged 13-16 years (M=15, 18 years) who met criteria for HFA/AS. A test with four differently designed written questions was given to all participating students. The results from a checklist of common academic difficulties correlated with type of cognitive style: students showing difficulties organising the learning situation, as well as with problem-solving, show weaker field dependent cognitive style. Their impairments in finding the global overview of the questions in the assessment and relating the information given to an overall understanding of the meaning of the question limit their abilities to succeed in test situations. The correlation between the test scores and the studentsí knowledge becomes weak if the student has an issue with communicating knowledge in written assessments.

O 1

29 August 2015 11:00 - 12:30

Room Purple_H2

Paper Presentation

Attitudes and beliefs

Attitudes and beliefs

Keywords: Quantitative methods,Reflective society,Reasoning,Science education,Informal learning,Knowledge creation,Content analysis,Cultural diversity in school,Culture,Workplace learning,Communities of learners,Teacher professional development,Attitudes and beliefs,Secondary education,Experimental studies,Student learning,Mathematics,Motivation and emotion

Sig's: SIG 11 - Teaching and Teacher Education,SIG 16 - Metacognition,SIG 4 - Higher Education,SIG 8 - Motivation and Emotion

Chairperson: Eleni Meletiadou, University of Cyprus, Cyprus

Deciding what might be true: Reasoning about the content or about the source of an argument

Quantitative methods,Reflective society,Reasoning,Science education,Informal learning,Knowledge creation

Friederike Hendriks, University of Muenster, Germany; Dorothe Kienhues, University of Munster, Germany; Rainer Bromme, Universitat Munster, Germany;

To deal with information problems, for example a medical treatment they decide to undergo, laypeople often search online. Consequently, they might be confronted with conflicting information, which is challenging to deal with for laypeople because of their bounded understanding of the underlying science. Two strategies could guide laypeopleís evaluation of such contradicting arguments: First-hand evaluation targeted at the content of an argument and second-hand evaluation referring to evaluation of the argumentsí sources. It is an open question how and when laypersons choose between these two strategies. For scrutinizing this question we developed an inventory. Using exploratory factor analysis in the first (N = 237) and confirmatory factor analysis in a second study (N = 345) an a scale for measuring strategies a layperson could turn to when dealing with an information problem was developed. In two subsequent studies, we tested the hypothesis that laypeople prefer second-hand evaluation rather than first-hand evaluation in situations in which they regard a problem as being difficult to deal with. In a third study with N = 82 either conflicting or complementary evidence was introduced to participants. In a fourth follow-up study (N = 60) we will test if the preference for first-hand versus second-hand evaluation is impacted by the scientificness (and consequential difficulty) of the topic. We will confront participants with a topic framed to be either relating to the daily-life experience of participants or inherent in science. Educational implications for informal learning will be discussed.

Bilingual Children's Literature as a tool to reflect Identities

Content analysis,Cultural diversity in school,Culture,Workplace learning,Communities of learners

Kalnisky Esther, Achva college of education, Israel; Lea Baratz, Ahva College of Education , Israel;

This study investigates the linkage of identity of new and veteran immigrant students of the Ethiopian community in Israel, by examining their attitudes to children's literature books written simultaneously in Hebrew and Amharic. Since literature is an important socialization agent, we examined the students' perceptions of their original culture versus their perceptions of the hegemonic Israeli culture. The data were collected using focus groups of Ethiopian students attending a teacher training college. The main findings revealed that they referred to two major types of identity: One type is an unreconciled identity, characterized by defiance, which seeks to minimize the visibility of one's ethnic group within the main culture and tries to adopt the hegemonic identity, whereas the other type of identity contains the original ethnic identity and óin contrast to the first typeó tries to reconcile it with the hegemonic culture.

Teachers'Beliefs: Are They Gender Related?

Quantitative methods,Teacher professional development,Attitudes and beliefs,Secondary education

Emmy de Kraker-Pauw, VU University Amsterdam, Netherlands; floryt van wesel, VU University Amsterdam, Netherlands; lydia krabbendam, VU University Amsterdam, Netherlands;

Teacher beliefs influence studentsí behaviour and learning outcomes. However, little is known about the role of specific teacher characteristics (gender, domain) in the formation of gender-related beliefs. In this study, three versions of the Implicit Association Test (IAT) were used, to assess gender-related beliefs regarding career, aptitude for science ,and learning style. The IAT-Learning Styles was especially designed for this study. The beliefs of 115 participants were investigated. Regarding career, results show a tendency to stronger gender related beliefs for women, whereas results on the IAT-Learning Styles indicated stronger gender related scores in men. Finally, male teachers, with a beta background appeared to have the strongest gender related beliefs regarding aptitude for science.

The relevance of mindsets for education: Mindset influences post-error adjustments on a math task

Experimental studies,Student learning,Attitudes and beliefs,Mathematics,Secondary education,Motivation and emotion

Nienke van Atteveldt, VU University Amsterdam, Netherlands; Ilse Fernandez Fuenzalida, VU University Amsterdam, Netherlands; Cynthia de Vries Lentsch, VU University Amsterdam, Netherlands; Lydia Krabbendam, VU University Amsterdam, Netherlands;

Studentsí implicit beliefs (ìmindsetsî) about the nature of their intelligence have major impact on school motivation and performance. Students with an ìentityî mindset believe that their intelligence is fixed and cannot be improved much by effort. Students with an ìincrementalî mindset believe that they can increase their abilities by working harder. A studentís mindset shapes their responses to academic challenge; an entity mindset often results in adopting maladaptive strategies to cope with failure and negative feedback. Stimulating an incremental mindset is therefore of great importance to improve motivation. We investigated the impact of studentsí mindset about their math ability on how they deal with making mistakes on a challenging math task. We looked at mindset as a trait and additionally manipulated mindset by presenting information about brain stability vs. plasticity (prime). After the prime, 15-year-old students performed a math-shifting task in which they solved equations while the mathematical rule changed occasionally. We analyzed the effects of trait mindset, primed mindset and school level on hit-rates and post-error adjustments. For both measures, we found an interaction between school level and priming condition; the lower school level showed the strongest priming effects. There was also a main effect of trait mindset on post-error slowing. These results demonstrate the impact of mindset on how adolescents learn from making math mistakes, and that this can be influenced by knowledge about brain plasticity. These findings can be communicated to math teachers to raise awareness of the impact of mindset on studentís math learning behavior.

O 2

29 August 2015 11:00 - 12:30

Room Green_A1

Paper Presentation

Classroom discourse

Classroom discourse

Keywords: Case studies,Video analysis,Attitudes and beliefs,Reasoning,Social aspects of learning,Primary education,Teaching/instruction,Social interaction,Science education,Student learning,Reflection,Mathematics,Secondary education,Knowledge creation,Qualitative methods,Researcher education,Communities of practice

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 21 - Learning and Teaching in Culturally Diverse Settings

Chairperson: Jan Berenst, University of Applied Sciences Leeuwarden , Netherlands

Unveiling elementary childrenís funds of knowledge and social values in dialogic literary gatherings

Case studies,Video analysis,Attitudes and beliefs,Reasoning,Social aspects of learning,Primary education

Rocio Garcia-Carrion, University of Deusto, Spain; Linda Hargreaves, University of Cambridge, United Kingdom; Ruth Kershner, University of Cambridge , United Kingdom;

This paper examines Dialogic Literary Gatherings (DLGs), in which children aged 7-11 years read and discuss the same classic texts. Although previous research has shown improvements in attainment when DLG are introduced in schools, it is not entirely clear how this association occurs. Our interest lies in the DLG affordances for learning in the English context, specifically in unveiling childrenís ëfunds of knowledgeí and enhancing reflective discussion about social values. This FP7 EU-funded research Childrenís Personal Epistemologies (ChiPE) (Marie Curie Actions, 2013-2015) which is studying the development of inclusive ëepistemic climatesí in primary classrooms. This paper reports the analysis of 13 sessions (25-55 minutes each) of DLGs in three schools in Eastern England, analysing changes over time. Quantitative and qualitative video analysis conducted using NVivo 10 indicates DLG enable most of the children to engage in a genuine dialogue by participating in the discussion on their personal choice or commenting on othersí ideas. Thematic analysis shows childrenís FoK were expressed when they relate the classic text with their everyday experiences and critically reflect on social and moral values. This form of ëinstructional conversationí challenges the banking model of education in that the teacher resituates him/herself as facilitator. We argue DLGs hold potential for meeting and exceeding the aims of the new Primary English Curriculum in an inclusive way.

Elementary studentsí scientific reasoning and discourse during cooperative inquiry science

Teaching/instruction,Reasoning,Social interaction,Science education

Robyn Gillies, The University of Queensland, Australia;

Teaching children to ask and answer questions is critically important if they are to learn to talk and reason effectively together, particularly during inquiry-based science where they are required to investigate topics, consider alternative propositions and hypotheses, and problem-solve together to propose answers, explanations, and prediction to problems at hand. This study involved 108 students (53 boys and 55 girls) from seven, Year 7 teachersí classrooms in five elementary schools in Brisbane, Australia. Teachers were randomly allocated by school to one of two conditions: the metacognitive questioning condition (Trained condition) or the prescriptive questioning condition (Untrained condition). Data on studentsí discourse and reasoning and problem-solving (RP-S) were collected across Times 1 and 2. The results showed that while there were significant differences in the discourse categories of the students in the two conditions at Time 1, the only significant difference was in questioning behavior at Time 2 with the students in the trained condition continuing to ask more questions than their untrained peers. A follow-up examination of studentsí discourse during their small group discussions illustrated how these students interacted with each other to probe and interrogate information by providing explanations and reasons to make their thinking explicit and by using analogies to verbally represent concepts they were trying to express. Results on the follow-up reasoning and problem-solving (RP-S) tasks indicated that students in the Trained and Untrained conditions improved their scores from Time 1 to Time 2 although the change was not significantly different between conditions.

Reflection and questioning in classrooms in different cultural settings

Video analysis,Student learning,Reflection,Mathematics,Secondary education,Knowledge creation

Mandy Hommel, University of Technology Dresden, Germany; David Clarke, University of Melbourne, Australia;

Reflection supports deeper elaboration, connections to prior knowledge, and application. Teacher questions can prompt a process of socially performed reflection in classroom learning. To support the development of students` reflection strategies teachers can model reflective behaviour using question sequences. This investigation used video, questionnaire and interview data from the Learnerís Perspective Study (Clarke et al., 2006) of four different cultural settings: Australia, Germany, Japan, USA. The following stratified forms of reflection were observable in the classrooms: Review, Summarization, and Elaboration. The different forms were not observed in equal measure in the twelve classrooms. The reflection events of Review in Australian, Japanese and US classrooms, Elaboration in German and US classrooms, and the Summarization activities of the Japanese teachers had the capacity to promote the use of reflection sequences in support of studentsí learning. Our analysis demonstrates the feasibility of classroom strategies for the promotion of student reflection internationally.

The critically literate educator and the poetic trope: Towards a reflexive reflection

Qualitative methods,Researcher education,Social interaction,Mathematics,Secondary education,Communities of practice

John Kusznirczuk, University of Melbourne, Australia;

Any move to a ëreflective societyí must, I suggest, be preceded by the development of critically literate educators. The critical literacy that I have in mind demands a particular quality of consciousness that is simultaneously displayed and developed publically, reflectively and reflexively, in a shared discourse of practice. The expression of this shared discourse recognises consciousness as a psychic faculty that develops in conjunction with the individual practitionerís society. Here, I consider the term ësocietyí as alluding to the social interaction that realises those regularities that individuals come to recognise as an order of interaction that, in its turn, realises a social order. In this paper I set out theoretically motivated arguments in support of a method that uses the ëpoetic tropeí as a ëcommon placeí, a ëcommon groundí from which to observe classroom interaction. The tropical episode is (in a given community of practitioners) a recognisable episode of activity that, in this method, acts as a shared starting point for the development of a critical literacy rooted in theory and the evidence of natural classroom interaction. I use an example of such a trope to demonstrate the application of this method to the task of operationalising an object of pedagogical knowledge by identifying the possibility of Vygotskiiís zone of proximal development operating in an instance of natural interaction recorded in an Australian Year 8 mathematics classroom.

O 3

29 August 2015 11:00 - 12:30

Room Yellow_G5

Paper Presentation

Cognitive skills

Cognitive skills

Keywords: Achievement,Intelligence,Higher education,Motivation and emotion,Psychometrics,Assessment methods and tools,Cognitive skills,Reasoning,Quantitative methods,Student learning,Literacy,Reading comprehension,Writing/Literacy,Primary education,Experimental studies,Instructional design,Technology,Game-based learning

Sig's: SIG 1 - Assessment and Evaluation,SIG 5 - Learning and Development in Early Childhood,SIG 7 - Learning and Instruction with Computers,SIG 8 - Motivation and Emotion

Chairperson: Petra A. Arndt, Ulm University, Germany

The Importance of Motivation for Lower Ability Students: An Incremental Validity Study

Achievement,Intelligence,Higher education,Motivation and emotion

Lawrence Cho, University of Michigan, United States; Stuart Karabenick, University of Michigan, United States; Steven Lonn, University of Michigan, United States; William Gehring, University of Michigan, United States;

We tested two questions in this incremental validity study: (1) Is there a difference in the amount of unique variance (incremental validity) accounted for by motivation above and beyond intelligence in the prediction of academic achievement among lower ability (versus normal ability) students? (2) Can motivation predict science achievement above and beyond intelligence? In light of a review by Cho & Karabenick (2014a) on the incremental validity of motivation over intelligence in the prediction of academic achievement among students in the normal range of ability, these two questions remained unanswered. The answer to the first question is ìyes.î This study found that the incremental contribution of motivation over intelligence ranged from approximately 3-8% among lower ability students versus 1-2% in a more typical sample of students. The types of motivational constructs providing incremental validity also differed across groups. The answer to the second question is also ìyes.î Personal interest in math and science was found to account for an additional 3% of the variance in science achievement above and beyond intelligence. These findings reveal important differences in the types of motivational constructs that are important for different students, and the extent to which they influence achievement above and beyond intelligence.

Measuring Fluid Intelligence at Age 4

Psychometrics,Assessment methods and tools,Cognitive skills,Intelligence,Reasoning

Jan-Eric Gustafsson, University of Gothenburg, Sweden; Ulrika Wolff, University of Gothenburg, Sweden;

The aim of the study is to investigate alternative ways to conceptualize and measure fluid intelligence (Gf) among young children. An empirical study is reported which involved a battery of cognitive tests administered to a sample of 364 children 4 years of age. Four tests represented the visuospatial problem solving type of tests (e.g., Raven) that traditionally is regarded as reflecting Gf. Tests measuring working memory and forward and backward short-term memory span also were included in the battery. Data was analyzed through a sequence of confirmatory factor analysis (CFA) models estimated with the Mplus program. The preferred model was a bi-factor model with a general Gf factor, and an orthogonal residual factor on which the visuospatial problem solving tests loaded. Methodological implications of the results are discussed in terms of threats to the construct validity of tests which are routinely used as indicators of Gf by the impact of the visual content of these tests. Theoretical implications for the interpretation of Gf are also discussed.

Longitudinal effects of phonological and morphological awareness skills on reading development

Quantitative methods,Student learning,Literacy,Reading comprehension,Writing/Literacy,Primary education

George Manolitsis, University of Crete, Greece; George K. Georgiou, University of Alberta, Canada;

The present study examined how early phonological and morphological awareness skills ñ measured at the end of grade 1 and grade 2 predict reading fluency and reading comprehension at the end of grade 3. Two hundred one (201) Greek Kindergarten children (mean age = 76 months at the first time of measurement) were followed from the beginning of Grade 1 to the end of Grade 3. The children were assessed four times during the study: at the beginning of Grade 1, and at the end of Grade 1, Grade 2, and Grade 3. The results showed that both morphological and phonological awareness were unique predictors of reading comprehension, but only phonological awareness was a unique predictor of reading fluency. However, morphological awareness contributed to reading comprehension better than phonological awareness did, when assessed at the end of grade 2. None of them survive after the control for cognitive skills and early word recognition as a predictor of reading comprehension when assessed at the end of grade 1. Similarly, phonological awarenessí contribution to reading fluency increased across time (from grade 1 to grade 2). Taken together these findings suggest that phonological awareness is more important for the reading fluency rather than for the reading comprehension, while the contribution of morphological awareness is important only for the development of reading comprehension.

Improving spatial abilities with a 3D immersive environment. A pilot study

Experimental studies,Instructional design,Cognitive skills,Technology,Higher education,Game-based learning

Sandra Berney, University of Geneva, Switzerland; Rosita Haddad, University of Geneva, Switzerland; Robert Hauck, University of Nottingham, United Kingdom; Gertraud Gradl, Uniklinik RWTH Aachen, Germany;

Spatial thinking deals with three-dimensional shapes, contents or information. Various activities in everyday life as well as in many scientific domains require understanding 3D information based on 2D representations. This task is challenging as it entails to mentally manipulate and/or rotate the 2D content. Evidence in the literature suggests that experience, training, or playing 3D games can improve spatial abilities. New technologies such as the 3D immersive environments are novel educational resources that should be considered. The pilot study reported here was conducted to investigate if training spatial ability, namely mental rotations, transfers on spatial standardized tasks (MRT and VVT). A 3D immersive spatial cognition trainer (SCT) with haptic interaction was developed to enable users to practice 3D manipulations through 4 levels of increasing difficulty. Sixteen 4th year medical students were randomly assigned to 2 conditions (training vs no-training). Unexpectedly, the no-training control group substantially improved their mental rotation ability performance. Findings could be explained by the short training duration, as well as a possible cognitive overload when manipulating 3D models for the training group.

O 4

29 August 2015 11:00 - 12:30

Room Green_A2

Paper Presentation

Collaborative and cooperative learning

Collaborative and cooperative learning

Keywords: Content analysis,Pre-service teacher education,Emotion and affect,Social aspects of learning,Higher education,Cooperative/collaborative learning,Quantitative methods,In-service teacher education,Teacher professional development,Student learning,Professions and applied sciences,Workplace learning

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 16 - Metacognition,SIG 4 - Higher Education

Chairperson: Freydis Vogel, Technische Universitat Munchen, TUM School of Education, Germany

Student teachersí academic emotions in self- and co-regulated learning

Content analysis,Pre-service teacher education,Emotion and affect,Social aspects of learning,Higher education,Cooperative/collaborative learning

Emmi Saariaho, University of Helsinki, Finland; Henrika Anttila, University of Helsinki, Finland; Kirsi Pyhalto, University of Oulu; University of Helsinki , Finland; Auli Toom, University of Helsinki, Finland; Janne Pietarinen, University of Eastern Finland, Finland; Tiina Soini-Ikonen, University of Tampere, Finland;

Self- and co-regulation are central elements in skillful student teacher learning. Prior studies have confirmed the interrelation between positive academic emotions and student engagement in self-regulated learning (Pekrun et al., 2002). Strong body of evidence further indicates that emotional regulation is an important factor in successful learning (Boekaerts, 2011). There are also some indicators that student teachers experience co-regulative learning activities highly significant (Perry et al., 2008; Authors 2014, under review). Yet, we know surprisingly little about the emotional landscape of self- and co-regulation of learning among student teachers. This study explores what kind of academic emotions primary school student teachers experience during self- and co-regulative learning. Altogether 19 Finnish primary school student teachers were interviewed. The data were qualitatively content analysed. Results showed that both self- and co-regulated learning experiences were emotionally activating. Academic emotions were more frequently reported in co-regulated (85%) than in self-regulated (68%) learning. Student teachers reported primarily positive emotions (82%) in self- and co-regulated learning. Results

further showed that positive activating emotions, such as enthusiasm, were emphasized in all regulatory phases, i.e. preparatory, performance and appraisal. Our findings on high frequency of various positive emotions embedded in self- and co-regulated learning confirmed that positive activating emotions are essential elements in student teachers self- and co-regulated learning. However, further investigation is required to find out what characterizes the kind of learning environment that provides both enough constructive frictions and scaffolding to facilitate student teachersí regulated learning, even when facing challenges, and experiencing negative deactivating emotions.

Team learning in teacher teams: Team entitativity as a bridge between teams in theory and practice

Quantitative methods,In-service teacher education,Teacher professional development,Higher education,Cooperative/collaborative learning

Katrien Vangrieken, KU Leuven, Belgium; Filip Dochy, KU Leuven, Belgium; Elisabeth Raes, KU Leuven, Belgium;

Although teams are increasingly prevalent in practice and research on teams and team learning is constantly rising, current research appears to focus on ëreal teamsí that meet certain strict and pre-defined criteria. However, not all teams in all contexts appear to meet these criteria. Teacher teams for example are often not real teams as defined in contemporary team literature and thus this context is underexplored in research on team learning. This paper focuses on these ambiguous teams. It uses the term ëteam entitativityí to describe this ambiguity and to present the team concept as a continuum ranging from a mere aggregate of individuals to a real team. This makes it possible to apply ëteam learningí frameworks to teams that do not strictly meet predefined team criteria. As such, we investigated the Team Learning Beliefs & Behaviours model to teacher teams in colleges for higher vocational education. The model indicates relations between the teamís beliefs about the interpersonal context, team learning behaviours and team effectiveness. Here, team entitativity was included as it shows considerable overlap with the included beliefs. Data were collected from 105 teams (total N = 488 members) and analysed using three-step multilevel analysis that showed that the suggested research model applied to our data.

Higher education studentsí perceptions of collaborative learning skills

Content analysis,Student learning,Higher education,Cooperative/collaborative learning

Essi Vuopala, University of Oulu, Finland; Piia Naykki, University of Oulu, Finland; Jaana Isohatala, University of Oulu, Finland; Sanna Jarvela, University of Oulu, Finland;

Skills for collaborative learning and teamwork are widely needed in todayís education and working life. The aim of this study is to investigate collaborative learning experiences and to identify learning skills that are needed in collaborative learning situations implemented both face-to-face and in technology-enhanced settings. A qualitative approach is utilized in the study and data-driven content analysis applied in the data analysis. Data is collected from an

international two years master's degree programme 'Learning, Education and Technology'. One cohort of students (N=12) reflected their collaborative learning skills as part of master's degree programme course 'Learning of expertise' and data consists of students' blog-diaries. Preliminary results indicate that collaborative learning skills include good communication skills, skills for emotion and motivation regulation, and skills for guiding and coordinating one's own activities. The results provide teachers and educational planners guidelines how to engage and enhance learners' active role in collaborative learning situations.

Patterns of interaction and their relation to participant satisfaction in online collaboration

Content analysis,Social aspects of learning,Professions and applied sciences,Workplace learning,Cooperative/collaborative learning

Helga Dorner, Central European University, Hungary; Rita Konyha, Ministry of Public Affairs, Hungary;

This study focuses on the relationships between online interactions, perceived satisfaction and group performance within small groups whose members collaborated in a problem-based learning scenario. We relied on the Community of Inquiry model (Garrison, Anderson, & Archer, 2000) to explore the social, cognitive and instructional dimensions of the small-group collaborations; and we also investigated how these dimensions relate to participant satisfaction and perceived group performance. Transcripts of interactions among the group members and their facilitators were analyzed by two independent coders using content analysis. Satisfaction with the process and the group performance were surveyed in a post hoc manner. Results revealed a strong correlation between process satisfaction and interactions characterized by manifestations of social presence. Teaching presence was linked to satisfaction with the facilitator and the process. Performance satisfaction correlated with cognitive presence, in particular, with interactions aiming at exploration and analysis. The current study did not find any relationship between perceived group performance and collaborative interactions, which needs further exploration. We also intend to discuss the limitations of the study.

O 5

29 August 2015 11:00 - 12:30

Room Green_A4

Paper Presentation

Conceptual change

Conceptual change

Keywords: Quantitative methods,Instructional design,Comprehension of text and graphics,Misconceptions,Secondary education,Knowledge creation,Student learning,Conceptual

change,Science education,Primary education,Inquiry learning,Learning analytics,Assessment methods and tools,Mathematics,Experimental studies,Physical Sciences

Sig's: SIG 3 - Conceptual Change,SIG 6 - Instructional Design

Chairperson: Dely Elliot, University of Glasgow, United Kingdom

Developing Conceptual Understanding in Ray Optics

Quantitative methods,Instructional design,Comprehension of text and graphics,Misconceptions,Secondary education,Knowledge creation

Rosa Hettmannsperger, Institut Universitaire de Formation des Enseignants (IUFE), Switzerland; Andreas Mueller, University of Geneva, Switzerland; Wolfgang Schnotz, University of Koblenz-Landau, Germany; Jochen Scheid, University of Koblenz-Landau, Germany;

A particular difficulty in physics learning is the fact that quite often pupilsí concepts of physics are in contrast with scientific explanations taught at school. These ìintuitiveî concepts interact with the new knowledge to be acquired in school. Moreover, these intuitive concepts are often resistant to instruction. This contribution reports empirical results of two related studies within an interdisciplinary project of physics education and educational psychology. Results of a study specifically targeted at widespread pupilsí intuitive concepts (511 pupils, 21 classes, 10 different teachers), were compared with results of a related study fostering representational coherence - without addressing pupilsí concepts (477 pupils, 17 classes, 8 different teachers). Pupils in both studies dealt with tasks focusing on representational competences in a sequence of six lessons about forming real images using a convex lens. Both studies used the same test instrument to assess conceptual understanding. Results of the studies were compared in a multilevel analysis using a concept-test in ray optics developed within the project. Results indicated that addressing widespread intuitive pupilsí concepts improved conceptual understanding significantly more than fostering representational coherence or traditional tasks. There was evidence for an intermediate effect size, which moreover was stable in the mid-term.

The association of scientific reasoning and conceptual knowledge across the elementary school years

Quantitative methods,Student learning,Conceptual change,Science education,Primary education,Inquiry learning

Judith Pollmeier, Leibniz Institute for Science and Mathematics Education (IPN), Germany; Steffen Troebst, Leibniz Institute for Science and Mathematics Education (IPN), Germany; Ilonca Hardy, Goethe-Universitat Frankfurt, Germany; Daniela Mayer, State Institute of Early Childhood Research, Germany; Christopher Osterhaus, University of Education, Germany; Thilo Kleickmann, Leibniz Institute for Science and Mathematics Education, Germany; Susanne Koerber, University of Education Freiburg, Germany; Kornelia Moller, University of Muenster, Germany; Beate Sodian, Ludwig-Maximilians-Universitat (LMU), Germany;

Contemporary conceptualizations of scientific literacy discern scientific reasoning as domain-general knowledge about the nature of science and scientific inquiry from domain-specific conceptual understanding of science content. Similarly, research on cognitive development sets apart the genesis of procedural scientific thinking from declarative conceptual knowledge. With respect to the interplay of the two aspects of scientific literacy, it is straightforward to assume that sound scientific reasoning fosters the acquisition of conceptual knowledge via improved utilization of available learning opportunities. Against this background, we investigated the impact of scientific reasoning on conceptual knowledge in two content areas ñ floating and sinking as well as evaporation and condensation ñ in a cross-sectional convenience sample of 1915 German second-, third-, and fourth-graders. For both content areas, we found a substantial association between scientific reasoning and conceptual knowledge that could not be readily explained by relevant covariates such as fluid intelligence, reading ability, interest in science, socioeconomic status, and immigrant status. In addition, specifically for the content area of floating and sinking, we obtained evidence for a substantial interaction between studentsí scientific reasoning and available learning opportunities in the prediction of conceptual knowledge. This lent further plausibility to the mechanism hypothesized to underlie the association between scientific reasoning and conceptual knowledge. Tentatively, these results point towards the potential of fostering scientific reasoning for enhancing the acquisition of conceptual knowledge in elementary school children. However, in face of the limitations of our cross-sectional study, further longitudinal and experimental investigations are needed to substantiate this claim.

Measuring and promoting change in correct and incorrect decimal fraction knowledge

Learning analytics,Assessment methods and tools,Conceptual change,Misconceptions,Mathematics,Primary education

Abbey Loehr, Vanderbilt University, United States; Bethany Rittle-Johnson, Vanderbilt University, United States;

The development of studentsí decimal fraction knowledge involves overcoming misconceptions that stem from previous knowledge of whole numbers. Specifically, students must distinguish between the discrete nature of whole numbers and continuous magnitudes of rational numbers. We measured and compared Grade 3 and Grade 4 U. S. studentsí decimal magnitude knowledge and misconceptions before and after a brief intervention. During the intervention, students played a decimal magnitude comparison game (i.e., which decimal is greater?) and received a lesson on related concepts. Overall, studentsí knowledge increased after the intervention in part due to a reduction in misconception errors. During the intervention, students had the highest gains in knowledge of magnitude comparisons and the role of zero for magnitudes, which may have been more easily extended from their prior whole number knowledge. However, Grade 3 and Grade 4 students differed in their developing knowledge of decimal magnitudes as measurements of quantity on number lines and the density property of decimals (e.g., choose a number that comes between 0.4 and 0.5). Grade 3 students had greater knowledge of measurement than density and showed increases in their fraction misconceptions over time. Grade 4 studentsí knowledge of density and measurement were similar, suggesting their knowledge was developing more cohesively. Results suggest important differences in understanding subcomponents of rational

numbers. Future research should measure different aspects of decimal knowledge including misconceptions to evaluate and inform instruction.

Relationships between Executive Functions and Conceptual Change Learning in Science and Mathematics

Experimental studies,Student learning,Conceptual change,Mathematics,Physical Sciences,Primary education

Stella Vosniadou, National and Kapodistrian University of Athens, Greece; Dimitris Pnevmatikos, University of Western Macedonia, Greece; Despina Lepenioti, National and Kapodistrian University of Athens, Greece; Anna Chountala, National and Kapodistrian University of Athens, Greece; Kalliopi Ikospentaki, National and Kapodistrian University of Athens, Greece; Nikos Makris, Democritus University of Thrace, Greece;

Many science and math concepts taught to children are counter-intuitive and require the inhibition of empirically supported everyday intuitive knowledge. We hypothesised that the considerable conceptual changes in science and math domains that occur during childhood as a result of development and learning implicate Executive Functions (EFs) and particularly the EFs of Inhibition and Shifting. In this study we examined this hypothesis by looking at the relationships between childrenís performance in two Conceptual Change (CC) tasks and two Stroop-like Inhibition and Shifting EF tasks. Sixty-nine children, 10 to 12 year-olds, participated in the study. The results showed high correlations between performance in the CC and the EF tasks, supporting the hypothesis that EFs are implicated in conceptual change processes required for the learning of science and mathematics concepts.

O 6

29 August 2015 11:00 - 12:30

Room Green_A3

Paper Presentation

Early childhood education

Early childhood education

Keywords: Quantitative methods,Developmental processes,Numeracy,Mathematics,Early childhood education,Psychometrics,Assessment methods and tools,Competencies,Experimental studies,Social sciences

Sig's: SIG 5 - Learning and Development in Early Childhood

Chairperson: Ilonca Hardy, Goethe-Universitat Frankfurt, Germany

Emergent mathematical skills in three-year-olds: Cognitive stimulation and executive functioning

Quantitative methods,Developmental processes,Numeracy,Mathematics,Early childhood education

Ineke van der Veen, University of Amsterdam, Netherlands; Liselotte Dikkers, Kohnstamm Instituut, Netherlands; Annemiek Veen, University of Amsterdam, Netherlands;

Growth in mathematical skills of children when they enter school has been found to be related to the level of mathematical skills. Yet, emergent mathematical skills in three-year-olds who are not yet in school, have rarely been studied. It is important to know if differences in emergent mathematical skills exist at a young age, and if these differences are related to parental cognitive stimulation and executive functioning. These differences offer opportunities for improvement of emergent mathematical skills in three-year-olds, especially of those from disadvantaged backgrounds, and reduce educational arrears. The present study focused on the influence of parental cognitive stimulation and executive functioning (namely: attention, inhibition and working memory) on emergent mathematical skills and differences of this by SES and home language. Data were used on 2722 three-year-old children who participated in the large cohort study pre-COOL. Cognitive stimulation of parents and executive functioning appeared to be related to emergent mathematical skills. Few differences between children with and without Dutch as the home language and with high or low SES existed.

Assessing Mathematical Competence in Kindergarten ñ A Validation Study in the Netherlands

Psychometrics,Assessment methods and tools,Competencies,Numeracy,Mathematics,Early childhood education

Christoph Duchhardt, IPN Kiel, Germany; Anne-Katrin Jordan, IPN Kiel, Germany; Anne van Hoogmoed, Utrecht University, Netherlands; Evelyn Kroesbergen, University of Utrecht, Netherlands; Aiso Heinze, Leibniz Institute for Science and Mathematics Education (IPN), Germany;

In the last decades, Kindergartenersí competences became a main topic of educational research also in large scale studies. Thereby, instruments assessing mathematics in kindergarten often mainly focus on ìnumeracyî. But frameworks for primary and secondary school usually define mathematical competence as a broader construct, including several content areas. To close this gap, the Kieler Kindergartentest (KiKi) ñ designed for children aged 4;0ñ6;6 ñ was developed in Germany. A Dutch adaptation of the KiKi was used in a validation study (N = 168 children from pre-schools in Utrecht, mean age = 5;1 years) aiming at questions of psychometric quality, age differences and especially convergent validity with respect to the established Utrechtse Getalbegrip Toets (UTG, Utrecht Early Numeracy Test) . Results based on IRT- and regression analyses indicate that the adapted test shows good psychometric properties and is well suited for longitudinal assessment. Effects from the UTG on KiKi hint at high convergent validity.

Using ECERS-R to examine the quality of Greek ECE environments: Results from Early-Q THALES project

Experimental studies,Assessment methods and tools,Social sciences,Early childhood education

Athanasios Gregoriadis, Aristotle University of Thessaloniki, Greece; Evridiki Zachopoulou, Alexander Technological Educational Institute of Thessaloniki, Greece; Vasilis Grammatikopoulos, University of Crete, Greece;

The purpose of this paper is to present some results from the Early-Q THALES project. The EARLY-Q THALES project is a European Union co-funded project for the evaluation of the quality of Early Childhood Education (ECE) in Greece. More specifically this paper presents the results from two of the seven subscales of the Early Childhood Environment Rating Scale-Revised (ECERS-R) that assess the quality of Activities and Programme Structure. Twenty assessors that were trained by attending two training seminars evaluated approximately 535 preschool classrooms from various regions of the country. Results showed that the evaluated classrooms obtained mean quality scores for Activities and Programme Structure within the 'adequate range'. Preschool classrooms generally performed well on items concerning math, literacy, art, fine motor and blocks, while they scored lower on items such as sand/water, nature/science, promoting acceptance of diversity. The findings overall highlight some of the strengths and the weaknesses of the Greek early childhood education system that will be discussed thoroughly in the presentation. *This project is implemented through the framework of the Operational Programme ´Education and Lifelong Learningª and co-financed from the European Union (European Social Fund) and from national sources.

Mathematics quality environment evaluation in early childhood education using ECERS-E

Quantitative methods,Assessment methods and tools,Social sciences,Early childhood education

Vasilis Grammatikopoulos, University of Crete, Greece; Athanasios Gregoriadis, Aristotle University of Thessaloniki, Greece; Evridiki Zachopoulou, Alexander Technological Educational Institute of Thessaloniki, Greece;

*This project is implemented through the framework of the Operational Programme ´Education and Lifelong Learningª and co-financed from the European Union (European Social Fund) and from national sources Mathematics is a very important subject in early childhood education and research findings support the link between a childís performance in mathematics at this early level and its later school achievement. The ìEarly-Qî Thales project (a European Union co-funded project for the evaluation of the quality of Early Childhood Education in Greece) incorporated the mathematics environment evaluation in Greek early childhood education by using the Early Childhood Environment Rating Scales ñ Extension (ECERS-E) (Sylva, Siraj, & Taggart, 2010). The scale was translated in Greek and 20 assessors observed and evaluate 535 classrooms throughout the country. The aim of this paper is to present the results from the main study of ìEarly-Qî Thales project regarding the evaluation of the mathematics environment quality.

O 7

29 August 2015 11:00 - 12:30

Room Brown_B1

Paper Presentation

Emotion and affect

Emotion and affect

Keywords: Qualitative methods,Peer interaction,Social interaction,Social sciences,Primary education,Secondary education,Reflective society,Social aspects of learning,Interdisciplinary,Higher education,Video analysis,Self-regulation,Early childhood education,Quantitative methods,Student learning,Achievement,Emotion and affect

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 5 - Learning and Development in Early Childhood,SIG 8 - Motivation and Emotion

Chairperson: Mireille Betrancourt, University of Geneva, Switzerland

Nature of students' emotional academic engagement

Qualitative methods,Peer interaction,Social interaction,Social sciences,Primary education,Secondary education

Tiina Soini-Ikonen, University of Tampere, Finland; Janne Pietarinen, University of Eastern Finland, Finland; Kirsi Pyhalto, University of Oulu; University of Helsinki , Finland; Sanna Ulmanen, University of Tampere, Finland;

This study explores studentsí emotional academic engagement as an integrated construct including studentsí attitudes towards schoolwork and sense of belonging in peer and teacher-student interaction. Especially the aim is to examine the un-/balanced interrelation between the perceived attitudes concerning schoolwork and sense of belonging in the schoolís everyday-life. The data were collected from the Finnish sixth (78) and eighth (89) grade students by picture tasks during their school days in the spring of 2011. The results showed that studentsí sense of emotional academic engagement was regulated by the balanced or frictioned interrelation between the school-related attitudes and sense of belonging. Accordingly, different types of student profiles that aims to break down the complexity of being emotionally and academically engaged student in the school community were found. The results indicated that studentsí emotional academic engagement is a multifaceted structure including both attitudes towards schoolwork and sense of belonging suggesting that attitudes or sense of belonging alone do not constitute to strong emotional academic engagement. For example perceived destructive social friction between the lack of sense of belonging and positive school-related attitudes means that students felt their schoolwork as meaningful, but they were not supported by their peers or

teachers and further, resulted to the lack of joy of learning. Thus to facilitate emotional engagement studentsí opportunities not just for positive interaction with both teachers and peers but also to an interaction that promotes experience of meaningfulness of the schoolwork should be intentionally designed.

How does Facebook affect learning processes? The role of the OSN in learning and studying

Qualitative methods,Reflective society,Social aspects of learning,Interdisciplinary,Higher education,Secondary education

Martina Braasch, University of Wuppertal, Germany; Petra Buchwald, University of Wuppertal, Germany;

High school and graduate students belong to the major group of Facebook users (allfacebook.de, 2014), the most popular OSN nowadays. In educational contexts, the use of social media for learning has been suggested as a desirable objective as it is supposed to facilitate exchange of knowledge through its social component and consequently could improve learning performance (Strafling & Kramer, 2013). Our study aims at investigating the role of Facebook for learning processes and how the OSN affects studying during examination periods. We hypothesize that two aspects influencing learning might be identified: social support (Kaniasty & Norris, 2001) as an important variable in coping processes might help students deal with academic stress and, on the contrary, Facebook as a stressor itself due to social pressure and compensatory activities available via the OSN could foster procrastination. Within the qualitative research design we conducted episodic interviews (Flick, 2007) with high school and graduate students (N=42) with an additional part in the interviews, where the interviewees reflected on their actual user behavior while logged in on Facebook. For the analysis, Mayringís content analysis was implemented (Mayring, 2010). The text corpora were analyzed with the computer-aided data analysis software MAXQDA (Kuckartz, 2010). Results show very different impacts Facebook might have for the various user types and depending on the individual usage of the platform, its outcomes might be detrimental or conducive for learning processes. Our findings will be discussed in terms of beneficial or detrimental use of Facebook.

How teachers support young childrenís regulation of emotions and behaviour in day-care situations

Qualitative methods,Video analysis,Self-regulation,Early childhood education

Kristiina Kurki, University of Oulu, Finland; Hanna Jarvenoja, University of Oulu, Finland; Sanna Jarvela, University of Oulu, Finland;

Decades of research have associated different aspects of self-regulation with learning and social competence among children. Effects of social interaction in the learning and development of self-regulation skills have also been acknowledged in several studies. In order to understand how self-regulation processes manifest and develop in the early years of childrenís lives, there is a need to study the interactive situations in childrenís everyday lives. This study focuses on

investigating the ways early childhood educators regulate childrenís activities, behaviour and emotions in various socio-emotionally challenging situations. Data in this study consists of video recordings of different challenging situations of 2-5 year old children in day care activities, analysed using interaction- and content analysis. The analysis is supported by stimulated recall interviews performed for the teachers. The results of this study indicate that teachers use various strategies to regulate childrenís activities in challenging situations. These findings, along with those of previous studies, suggest a need for teachers to scaffold childrenís developing skills of regulatory actions in early childhood contexts.

How do emotions change over an assessment event and how does the change relate to achievement?

Quantitative methods,Student learning,Achievement,Emotion and affect,Higher education

Elizabeth R Peterson, University of Auckland, New Zealand; Chae Ok (Miriam) Jun, Univerisity of Auckland, New Zealand; Gavin Brown, The University of Auckland, New Zealand;

An increasing number of emotions have been found to affect the way students learn and their academic achievement. However, little is known about how dynamic these achievement emotions (AE) are, the extent to which they vary with the assessment process, and how they relate to prior academic ability and student achievement outcomes. Our intensive longitudinal diary study with tertiary studentsí (N = 166) examined their AEs across a three week assessment period (study, test and feedback week). Overall, the results indicate that the changeability of the studentsí AEs during study week and test week had statistically significant relationships with academic ability and achievement. In contrast, the studentí starting levels of emotions had statistically significant relationship with academic ability and achievement after the test results were known. There was one exception to this, as students with higher academic ability reported slightly higher starting level of anxiety during the test week. These findings substantially expand our knowledge about the relationship between AEs, academic ability and achievement and how they change in relation to an assessment event.

O 8

29 August 2015 11:00 - 12:30

Room Brown_B8

Paper Presentation

Higher education

Higher education

Keywords: Phenomenography,Teaching/instruction,Conceptual change,Engineering,Higher education,Comparative studies,Quantitative methods,Researcher education,Attitudes and

beliefs,Parental involvement in learning,Social aspects of learning,Secondary education,Qualitative methods,Student learning,Argumentation,Cognitive skills

Sig's: SIG 21 - Learning and Teaching in Culturally Diverse Settings,SIG 24 - Researcher Education and Careers,SIG 4 - Higher Education,SIG 9 - Phenomenography and Variation Theory

Chairperson: Jan Huyton, Cardiff Metropolitan University, United Kingdom

What Can Practitioner Perceptions Tell Us About Our Subject?

Phenomenography,Teaching/instruction,Conceptual change,Engineering,Higher education

Errol Thompson, Aston University, United Kingdom;

Part of the challenge of fostering learning is to open up learner minds to new possibilities or ways of thinking but is what we are encouraging learners to think really that different from the current practitioner conceptions? Having been uncomfortable with the focus of textbooks for the teaching of the core concept, the nature of a program, in the teaching of object-oriented programming, we sought to discover how practitionerís conceived the concept. Our findings provide a framework for understanding the different ways of conceiving the concept and the features that distinguish these conceptions. How could these conceptions and their critical features influence the focus in teaching especially in relation to computational thinking?

The Conditions of Academic Work in Macedonia: Exploring the Perceptions of Junior Academics

Comparative studies,Quantitative methods,Researcher education,Attitudes and beliefs,Higher education

Martin Galevski, University of Oxford, United Kingdom;

The analysis of the academic profession has been one of the main scholarly interests in the field of higher education studies recently. Although the growing literature available tends to provide a fairly comprehensive global overview of the academic profession, the experience of academics in a number of smaller and less mature higher education systems such as the Macedonian one remain on the margins of the contemporary debate. The main aim of this study is to compare junior academicsí perceptions on the conditions and challenges of academic work in Macedonia, with those of junior academics in 13 European countries where a similar comparative survey-based study on the academic profession in Europe (EUROAC) has been previously conducted. Overall, the findings of the study suggest that the present state of the academic profession in Macedonia is far from promising and points to the fact that junior academics in Macedonia endure much more difficult circumstances compared with junior academics elsewhere in the scope of EUROAC. More specifically, the findings of the study point out that Macedonian junior academics are much like their EUROAC colleagues when it comes to the use of time and

average workload, however, they are strikingly different in terms of their (dis)satisfaction with remuneration, career prospects, opportunities for advancement and working condition.

The impact of significant others on gender-atypical, gender-typical and gender-neutral study choices

Quantitative methods,Parental involvement in learning,Social aspects of learning,Higher education,Secondary education

Hanke Korpershoek, University of Groningen, Netherlands;

Despite increasing interest in gender-atypical careers, few students actually enter a gender-atypical study field in Dutch higher education (higher professional education and university). For example, few females enter technical and science study fields and few males enter the field of health care. Our main aim was to investigate the perceived impact of significant others, such as parents and peers, on studentsí study choices. The study included 2,102 students in higher education. They received a questionnaire and indicated in retrospect which studies they had considered, which study they eventually chose, which people had influenced their study choice, and what their advices were. The main finding was that, generally, studentsí choices were supported by their significant others (especially parents), regardless whether they chose a gender-typical, gender-atypical, or gender-neutral study field.

University applicantsí critical thinking skills: The case of Finnish educational sciences

Qualitative methods,Quantitative methods,Student learning,Argumentation,Cognitive skills,Higher education

Jukka Utriainen, University of Jyvaskyla, Finland; Miika Marttunen, University of Jyvaskyla, Finland; Eeva Kallio, University of Jyvaskyla, Finland; Paivi Tynjala, University of Jyvaskyla, Finland;

Mastering critical thinking skills during university studies is a challenging task for students; hence universities should be able to select those students, who have the best prerequisites to accomplish this task. This study investigates the quality of Finnish educational sciences applicantsí critical thinking skills and how their skills are associated with their previous academic achievement in upper secondary school, and their university entrance examination test scores. The data consist of 77 applicantsí responses to an ill-structured problem solving task and their matriculation examination and entrance examination test scores. The results indicated that the applicantsí critical thinking skills were twofold, as their comparison skills were partially limited, whereas their argumentation skills were moderate. Furthermore, the results showed that the applicantsí matriculation examination and entrance examination test scores correlated with their critical thinking skills. Additionally, the entrance examination test was the only significant predictor for the comparison skills (5 % variance explained), and matriculation exam was the only significant predictor for the argumentation skills (29 % variance explained). Overall, the results suggest that educational sciencesí entrance examination does not measure critical thinking skills very well. So the examination test should be developed to measure these skills more

explicitly. Because the applicantsí had limitations in their critical thinking skills, these skills should be taught already from the beginning of the university studies.

O 9

29 August 2015 11:00 - 12:30

Room Brown_B2

Paper Presentation

Higher education

Higher education

Keywords: Qualitative methods,Teacher professional development,Reflection,Professions and applied sciences,Higher education,Lifelong learning,Quantitative methods,Interdisciplinary,Communities of learners,Peer interaction,Self-efficacy,Social interaction,Social aspects of learning,Citizenship education

Sig's: SIG 4 - Higher Education

Chairperson: Cornelia Schoor, University of Bamberg, Germany

How awarded teachers perceive their professional development paths through critical incidents?

Qualitative methods,Teacher professional development,Reflection,Professions and applied sciences,Higher education,Lifelong learning

Laura Hirsto, University of Eastern Finland, Finland; Pyorala Eeva, University of Helsinki, Finland; Auli Toom, University of Helsinki, Finland; Liisa Myyry, University of Helsinki, Finland; Sari Lindblom-Ylanne, University of Helsinki, Finland;

The aim of this study is to understand the professional development of excellent university teachers, and the perceptions they have about the critical incidents during their developmental paths as academic teachers. This study is part of a research project focusing on the academy of excellent university teachers, in which the qualities and the development of scholarship of teaching within the pedagogical communities of practice are examined. The specific research questions are: 1) What kinds of critical incidents do excellent university teachers describe? 2) Where or with whom do the critical incidents take place? 3) Why do these teachers perceive certain incidents as critical? The data were collected through 30 narrative interviews, in which the participants were given a time-line in which they were to place meaningful experiences (critical incidents), which had affected themselves as teachers. Preliminary analysis revealed that excellent teachers had experienced both empowering and challenging critical incidents related to learning and teaching during their career. Many respondents reflected strongly the experiences as

university students. The critical incidents were mainly positive experiences of good teaching, however also some respondents regarded poor teaching as the trigger to do something differently in their own teaching. Also, many critical incidents were experienced during the early university career. These included collaborative teaching and development of teaching. Critical incidents in the path were also related to pedagogical education in which they had participated. The results are discussed thought theoretical viewpoints of teachersí self-understanding and scholarship of teaching as well as development of teacher excellence.

The Construction of the First Year Student Engagement in Studies in Higher Education

Quantitative methods,Interdisciplinary,Higher education,Communities of learners

Vesa Korhonen, University of Tampere, Finland; Mikko Inkinen, University of Helsinki, Finland; Auli Toom, University of Helsinki, Finland;

Since the first year of studies in higher education, students are expected to progress successfully in their studies. Student engagement in higher education and university studies has been identified as one of the key elements related to effective and meaningful learning path throughout the study career in university (Coates 2007; Kahu, 2013). Both internal factors, e.g. motivation, expectations for university studies and emotions, and contextual factors e.g. systemic structures, curricular issues and pedagogical practices contribute to the construction of student engagement (Lardner & Malnarich, 2008; Matthews et.al, 2011; Soria & Stebleton, 2012). Student engagement changes continuously in the interplay between the individual student and the surrounding context, and thus, it can be affected in various different ways. This study explores the Finnish first year university studentsí (N=2422) engagement in the university studies by integrating both the individual and collective approaches. The factor analysis and cluster analysis were carried out. The results showed that significant factors related to student engagement are (I) meaningful belongingness, (II) contacts to other students, (III) regular and functional study habits, and (IV) practices that enhance participation. The study defined four various profiles of student engagement: generally well engaged, academically engaged, socially engaged, and uncertainly engaged. These profiles show the significant differences in student engagement constructed already during the first year of studies. The results indicate that both the individual and contextual factors play a significant role in the construction of student engagement, and thus, the construction of engagement can be supported significantly.

Group-work at the university: Motivation and performance

Peer interaction,Self-efficacy,Social interaction,Higher education

Luc De Grez, KU Leuven campus Brussels, Belgium; Irene Roozen, KULeuven, Belgium;

Group-work has become widespread in education and so it is important to gain a better understanding of what affects group performance. Through this understanding teachers could become more effective in improving group functioning. This study investigated the interplay between efficacy beliefs on the individual and on the group level and marks given by coaches and peers. Participants were first-year economics students assigned to 39 teams. Measurements

about their motivation were performed at three points in time. In total 116 (55.2% male) of the 284 students who completed the group assignment also completed the three questionnaires. Results suggest a significant decrease in self-efficacy for female participants from the first to the second measurement. Participants with marks lowered by peers have a lower score on self-efficacy for group facilitation and their scores were also significantly lower at the end compared to the other participants. Furthermore, a significant interaction effect was found between the marks given by the coaches and the individual outcome expectations of the students. These results seem to suggest that scores on self-efficacy and outcome expectations could help practitioners to detect group-work problems at the university at an earlier stage.

Social learning and social engagement: Moderated mediation by critical thinking and discipline

Quantitative methods,Social aspects of learning,Citizenship education,Higher education

Simon Beausaert, Universite catholique de Louvain (UCL), Belgium; Oscar van den Wijngaard, Maastricht University, Netherlands; Mien Segers, Maastricht University, Netherlands; Wim Gijselaers, Maastricht University, Netherlands;

The debate about the social mission of the university raises the question about the way in which higher education fosters social engagement (also known as civic or political engagement) in students. Academic discipline and social learning have been identified as determinants of the level of social engagement students attain in higher education. Postulating Political Interest and Agency as conditions for social engagement, and on the basis of data gathered at a Dutch liberal arts college, the paper proposes a two-tiered synthesis of the literature on academic discipline and social learning and their respective effects on social engagement. At the first level we assume that the relationship between social learning and the development of conditions for social engagement is being mediated by critical thinking, which is often considered to be both an outcome of social learning, and a contributor to social engagement. At the second level we assume that due to differences in approaches to learning and teaching, academic discipline moderates this mediation. This study concerns a base-line measurement, but results suggest that this synthesis is viable, and furthermore that the ësoftí sciences relate to a way of teaching and learning that stimulates critical thinking more, and thus prepare students more for becoming socially engaged than the ëhardí sciences.

O 10

29 August 2015 11:00 - 12:30

Room Brown_B3

Paper Presentation

Instructional design

Instructional design

Keywords: Experimental studies,Instructional design,Literacy,Language (L1/Standard Language),Out-of-school learning,Primary education,Technology,Computer-assisted learning,Multimedia learning,Student learning,Learning approaches,Cognitive skills,Higher education

Sig's: SIG 6 - Instructional Design,SIG 7 - Learning and Instruction with Computers

Chairperson: Tim Kuhl, University of Mannheim, Germany

Invitations to parents increase schoolchildrenís completion of the Premierís Reading Challenge

Experimental studies,Instructional design,Literacy,Language (L1/Standard Language),Out-of-school learning,Primary education

Orla Colgate, University of Sydney, Australia; Paul Ginns, University of Sydney, Australia; Nigel Bagnall, University of Sydney, Australia;

Background. In order for children to become skilled readers they require time to practice; parents have an opportunity to assist with practice, and when they play this role, research has shown their effect to be significant. This study is concerned with one of the most important ways that parents can be involved in their childís education ñ assisting them to become a proficient reader. Past research has found invitations from the classroom teacher and the children themselves may impact upon parentsí decisions to be involved in childrenís education at home. The present study focuses on two potential sources of motivation for that involvement - the teacher and the child - to design invitations related to reading. Method. Two quasi-experiments were conducted in two schools located in Sydney, Australia, testing two interventions across Kindergarten and Year 1 to raise completion rates of an Australia-wide annual reading programme, the Premierís Reading Challenge (PRC). Depending on the grade, parents of students in classes assigned to experimental conditions received a) a teacher invitation to the parent (Study 1: Kindergarten, N = 110), or b) a child invitation to the parent (Study 2: Grade 1, N = 93). Results. Differences between experimental and control classroom completion rates seven months after invitations were sent home were large and statistically significant across both interventions (Study 1: d = .68; Study 2: d = .73). Conclusion. Taken together, these results indicate invitations are a simple, low-effort, low-cost and effective means for teachers to elicit parentsí meaningful involvement in their childrenís reading.

Gender Effects when Learning from Instructional Animations Depicting Lego Tasks

Experimental studies,Instructional design,Technology,Computer-assisted learning,Multimedia learning

Paul Ayres, University of New South Wales, Australia; Mona Wong, University of New South Wales, Australia; Juan Cristobal Castro-Alonso, Universidad de Chile, Chile; Fred Paas, Erasmus University Rotterdam/University of Wollongong, Netherlands;

Learning a manipulative task is generally more effective when watching animations that show natural motions of the task, rather than equivalent static pictures. The present study was completed to explore this research domain further by investigating the impact of gender on static and animation presentations. University students were randomly assigned to either a static or animation condition and watched a computer-controlled presentation of a Lego shape being built. After each of two presentations, students were required to construct the task. They also completed a transfer task. Results indicated no differences between genders or an overall advantage for the animated format. However, a number of genderñpresentation format interactions were found independent of spatial ability. Follow-up analyses suggested that females benefited more than males from using animated presentations, but for static pictures a reverse trend was found as males benefitted more than females. The findings have implications for both instruction design as well as research methodology.

The Impact of Segmentation on Written and Spoken Explanations involving Complex Explanatory Text

Experimental studies,Instructional design,Student learning,Learning approaches

Anne-Marie Singh, University of New South Wales, Australia; Paul Ayres, University of New South Wales, Australia; Nadine Marcus, University of New South Wales, Australia;

Providing lengthy explanatory spoken text can have a negative impact on learning due to the transient information effect. This effect occurs when learning is reduced as a result of information disappearing before the learner has time to adequately process it, or link it with new information. Such processing takes valuable working memory resources away from learning. Two effective strategies have been shown to reduce this effect: One is replacing spoken text with written text, and the second is to segment the text into smaller sections. The main aim of the present study was to investigate the impact of segmentation on transitory text further by using tasks with different complexities. Two tasks were constructed requiring answers from information contained in single segments (segmented task), and the integration of information across multiple segments (integrated task). Using a 2 (written vs. spoken text) x 2 (segmented vs. continuous text) design, 62 grade-10 students were randomly assigned to one of the four treatments to learn about the economic cycle. Results indicated no significant differences on the segmented task, but on the integrated task the written text was superior to the spoken text, and the continuous text superior to the segmented text. It was concluded that to overcome the effects of lengthy transient text, written text is a more robust method than segmentation, especially when dealing with information that needs to be integrated together.

Varying degrees of instructional support: When shifting is more important than working memory

Experimental studies,Instructional design,Cognitive skills,Higher education

Matthias Schwaighofer, Ludwig-Maximilians-Universitat (LMU), Germany; Markus Buhner, LMU Munich, Germany; Frank Fischer, Ludwig-Maximilians-Universitat (LMU), Germany;

The relevance of the basic cognitive functions working memory, shifting and fluid intelligence for many cognitive tasks has been shown repeatedly. In particular, working memory is important for learning and should be considered for decisions regarding instructional support. The role of basic cognitive functions and fluid intelligence for knowledge acquisition in learning environments with varying degrees of instructional support has not yet been investigated systematically. This study examines the role of basic cognitive functions and fluid intelligence in learning environments with low vs. high degrees of instructional support. 76 students learned with statistical problems either with high instructional support by worked examples or with low instructional support through problem-solving. Results showed that shifting and fluid intelligence, but not working memory capacity had a moderating influence on knowledge acquisition. The authors conclude that shifting and fluid intelligence should be considered when low vs. high instructional support is contrasted. More studies are needed to replicate our findings and further explore the role of different basic cognitive functions in learning environments with varying degrees of instructional support. Keywords: basic cognitive functions, fluid intelligence, instructional support, knowledge acquisition, worked examples, shifting, domain of statistics

O 11

29 August 2015 11:00 - 12:30

Room Brown_B4

Paper Presentation

Instructional design

Instructional design

Keywords: Experimental studies,Instructional design,Student learning,Achievement,Higher education,Learning in context,Numeracy,Mathematics,Primary education,Video analysis,Teaching/instruction,Learning approaches,Social sciences,Knowledge creation,Educational technology,Cognitive skills,Comprehension of text and graphics

Sig's: SIG 2 - Comprehension of Text and Graphics,SIG 6 - Instructional Design

Chairperson: Slava Kalyuga, University of New South Wales, Australia

Effects of increasing Disfluency Levels on Learning Outcomes

Experimental studies,Instructional design,Student learning,Achievement,Higher education,Learning in context

Julia Westphal, Ulm University, Germany; Verena Fritz, Ulm University, Germany; Nina Singer, Ulm University, Germany; Tina Seufert, Ulm University, Germany;

In some cases difficult-to-read learning materials lead to better performance than easy-to-read materials. This phenomenon called disfluency effect and is attributed to a subjective feeling of task difficulty resulting in a deeper learning processing. But findings of the disfluency effect are inconsistent because different kinds of disfluency and different performance levels have been used. Therefore we are first to investigate the impact of increasing disfluency level on learning outcomes in two studies in different learning domains with varying difficulty. As results have shown, the effect of increasing disfluency levels on learning performance indicates an adverse u-shaped pattern. In other terms middle disfluency levels promotes better overall learning performance (study 1) and transfer performance (study 2), whereby the intensity of the middle disfluency level seems to be depended on the difficulty of the task. Limitation of the studies are the very easy material (study 1) and the small subject number (study 2). Therefore further studies which investigates different levels of disfluency have to be conducted.

Mirror-based observation of body movements and childrenís learning to build two-digit numbers

Experimental studies,Instructional design,Numeracy,Mathematics,Primary education

Margina Ruiter, Erasmus University, Netherlands; Sofie Loyens, Erasmus University, Netherlands; Fred Paas, Erasmus University Rotterdam/University of Wollongong, Netherlands;

In this study we investigated whether task-related body movements yield beneficial effects on the learning of two-digit decimal numbers, and whether these learning effects are affected by mirror-based self-observation of those movements. 118 first-graders were randomly assigned to two movement conditions, i.e. move and move & mirror, and two non-movement control conditions. In the movement conditions, children were instructed to build two-digit numbers by making and simultaneously verbalizing out loud different sized steps representing the smaller units the number consists of (e.g., the number ë36í is construed by saying out loud ì10î, ì20î, ì30, ì35î, ì36î, while making 3 big steps, 1 mediate and 1 small step) on a ruler across the floor. In the move & mirror group, the children were additionally asked to observe their steps in a mirror. In the first conventionally taught control condition the children were asked to verbally build and mark the two-digit numbers on a ruler depicted on a sheet of paper. In the second control condition, children were seated before the ruler across the floor, and after verbally construing the two-digit number, they had to walk to the appropriate place of the number on the ruler across the floor. In the subsequent test phase, childrenís knowledge of two-digit numbers was assessed by a final math test. The results confirmed the hypothesis that the movement conditions resulted in higher test performance than the non-movement conditions. The mirror did not affect test performance.

Constructivist teaching - A ìnew paradigmî or ìan assembly of long-known methodsî

Video analysis,Teaching/instruction,Learning approaches,Social sciences,Primary education,Knowledge creation

Mikko Tiilikainen, University of Turku, Finland; Jukka Husu, University of Turku, Finland;

The nature of teaching sequences in five primary school classrooms were examined in relation to constructivist instruction. Qualitative case studies were utilized and video-recording used as an observational tool. The recordings were analyzed using a deductive coding scheme consisting of four categories of constructivist instruction: emphasis on knowledge construction activities, actualization of student agency, situational learning-environment and problem-oriented learning environment. Student agency seemed to be the main discerning factor between teachers. When students were not the primary agents, some constructivist characteristics could still be recognized. However, the actual difference related to the traditional teaching was problematic due to teacher-centered teaching methods. The other teachers favored more collaborative approaches during problem-oriented phases. Still, the role of constructivist background principles was unclear, especially when the validity of student constructions was evaluated in the classrooms. It is suggested, that more multi-focal discussion is needed between teaching-philosophical, didactical, and learning-theoretical viewpoints when broad understanding of instructional and constructive mechanisms is pursued.

Does disfluency only pay off when learners have sufficient working memory capacity?

Experimental studies,Educational technology,Instructional design,Teaching/instruction,Cognitive skills,Comprehension of text and graphics

Christina Goussios, Ulm University, Germany; Tina Seufert, Ulm University, Germany;

According to cognitive load theory learning material should be designed in a way to decrease unnecessary demands on working memory (Sweller, van Merrienboer, & Paas, 1998). However, recent research (Diemand-Yauman, Oppenheimer, & Vaughan, 2011; Eitel, Kuhl, Scheiter, & Gerjets, 2014; Scheiter, & Schuler, 2011) has shown that additional demands on working memory caused by less legible texts lead to better learning outcomes. This so-called disfluency-effect is based on the fact that learners have to put more effort into learning which leads to deeper processing. Yet there are studies (Eitel et al., 2014; Yue, Castel, & Bjork, 2013) which could not replicate the disfluency-effect indicating that not every learner profits from disfluency. Additional demands on working memory caused by disfluent texts are possibly just usable by learners with a high working memory capacity. The present study investigated the aptitude-treatment-interaction between working memory capacity and disfluency. Learning outcomes were measured by means of a retention test, an application test, and a transfer test. Moreover, the three types of cognitive load (intrinsic, extraneous, and germane) were assessed. The results revealed significant aptitude-treatment-interaction-effects with respect to retention and application. Working memory capacity had a significant influence only in the disfluency-condition: The higher the working memory capacity, the better the retention and application performance. No interaction-effects were found with respect to transfer or the three types of cognitive load. Thus, cognitive load theory could not serve as an explanation for the disfluency-effect. Besides working memory, future research should identify other aptitudes which interact with disfluency.

O 12

29 August 2015 11:00 - 12:30

Room Green_A5

Paper Presentation

Language education

Language education

Keywords: Quantitative methods,Bilingual education,Second language acquisition,Developmental processes,Language (Foreign and second),Qualitative methods,Assessment methods and tools,Student learning,Peer interaction,Experimental studies,Self-regulation,Primary education,Educational attainment,Literacy,Reading comprehension

Sig's: SIG 1 - Assessment and Evaluation,SIG 16 - Metacognition,SIG 21 - Learning and Teaching in Culturally Diverse Settings,SIG 5 - Learning and Development in Early Childhood

Chairperson: Xavier Fontich, University of Exeter, United Kingdom

Factors and learning environments that influence second language development of pre-school children

Quantitative methods,Bilingual education,Second language acquisition,Developmental processes,Language (Foreign and second)

Franziska Egert, University of Applied Science Esslingen, Germany; Katarina Groth, Ulm University, Germany;

Over the last decade, the influence of natural, non-instructional and formal education on second language learning processes became centered in educational research. The study investigates factors influencing second language development of bi-/multilingual children in German preschools cross-sectionally (at preschool entry) and longitudinally (end of first year of preschool). Based on the socio-ecological model of Bronfenbrenner (1994), predictors of second language development will be examined with respect to child, family, and preschool characteristics. Furthermore, the value add of structured language intervention in addition to the natural ecological environments will be analyzed. Overall, 171 bi-/multilingual children with a mean age of 45.68 months (SD=6.50) from 19 public and private preschools participated in the study. From the 19 preschool, 11 use a specific language intervention program for second language acquisition while 8 preschools perform second language promotion in natural non-instructional settings. Children from both groups were equally with regards to sociodemographic variables. Results from hierarchical regression analyses show that second language abilities (speech production, receptive and expressive vocabulary) at preschool entry are mostly influenced by age, first language abilities and phonological working memory of children. Further, occupational status, family learning activities, and family language predicts second language abilities as well as early child care experience prior to preschool. Longitudinal data will be presented, investigating the additional impact of specific language intervention on second

language development. Identifying predictors that successfully promote second language development of young children can help researches and practitioners to develop better intervention and instructional practices in preschool and family homes.

Learning about writing from giving feedback: Insights from EFL classrooms in secondary school

Qualitative methods,Assessment methods and tools,Student learning,Peer interaction,Language (Foreign and second)

Jessica Berggren, Stockholm University, Sweden;

The purpose of this paper is to describe potential benefits of engaging secondary-level EFL learners in peer-review activities; more specifically, it seeks to answer the overarching research question: What do pupils learn about L2 writing from giving feedback? The study presented in this paper is an interventional classroom study, which was carried out in three EFL classrooms in year eight in a Swedish lower secondary school, where the pupils were engaged with the written task to write an informative reply letter in English. Data were collected from multiple sources: texts, video-recordings, and self-reports. The main findings suggest that pupils can learn about writing from giving feedback. Among other things, the pupils raised their genre and audience awareness. Furthermore, the pupils borrowed ideas, content and organisation from the reviewed letters. Self-reports also indicated that transferable skills were developed as a result of peer review. My findings contribute to research on EFL writing and peer feedback by showing that younger learners can benefit from giving feedback. This is significant since previous research has mainly been carried out at university and college level.

FL vocabulary learning: Strategy and meta-strategy knowledge

Experimental studies,Quantitative methods,Self-regulation,Language (Foreign and second),Primary education

Mirella Wyra, Flinders University, Australia;

In this experiment students (n=67) were taught how to use the keyword method (KWM) for learning foreign language (FL) vocabulary. The explicit strategy instruction focused on the encoding and retrieval processes. Students used KWM to learn new Spanish-English word pairs. Five weeks after their strategy training and vocabulary learning sessions studentsí detailed strategy and metastrategy knowledge was examined. The relationship between this knowledge and students bi-directional vocabulary recall was also of interest. The results of analyses conducted using SPSS and PLSPATH programs showed differences in studentsí strategy knowledge and confirmed that it contributed to FL vocabulary recall success. Students in the retrieval training group knew more about the use of KWM at the time of retrieval in both recall directions than did students who were only taught how to use KWM for encoding of new word-pairs. The metacognitive awareness of the interplay of elements and processes involved in encoding and retrieval was also examined.

Reading self-concept and reading achievement in children with German as a second language

Second language acquisition,Educational attainment,Literacy,Reading comprehension

Robin Segerer, University of Wuerzburg, Germany; Sandra Schmiedeler, University of Wuerzburg, Germany; Wolfgang Schneider, University of Wurzburg, Germany;

Our study aims to model the interplay between first (L1) and second (L2) language learnersí reading attainment and reading self-concept during elementary school. Based on previous studies, we anticipated disproportionally high reading self-concept scores for L2-students. Likewise, we expected lower effects of reading achievement on subsequent reading self-concept scores for L2-students compared to their monolingual peers. Data were collected in a large German community sample that consisted of 937 monolingual and 639 bilingual elementary school students with German as a second language. The L2-sample mostly consisted of children with Turkish or Russian as their first language. Word reading fluency and reading self-concept were measured through the four grades of elementary school. Reading comprehension was first measured in second grade. As we anticipated, L2-students reported significantly higher latent reading self-concept values than their monolingual peers in first and second grade despite stable disadvantages in reading achievement. In third and fourth grade no significantly different reading self-concept values were obtained. The cross-lagged paths revealed reciprocal effects of reading achievement and self-concept for monolingual children from first grade onwards. As hypothesized, L2-learners showed significantly lower effects of reading achievement on subsequent self-concept scores compared to their monolingual peers. These results might reflect protective forces at specific time points in the childrenís school career, e.g. teachersí cautious attitudes or pedagogical practices towards L2-learners.

O 13

29 August 2015 11:00 - 12:30

Room Green_A6

Paper Presentation

Lifelong learning

Lifelong learning

Keywords: Quantitative methods,Informal learning,Workplace learning,Lifelong learning,Attitudes and beliefs,Motivation and emotion,Educational technology,Problem solving,Vocational education,Goal orientation,Self-efficacy,Out-of-school learning

Sig's: SIG 14 - Learning and Professional Development

Chairperson: Andreas Gegenfurtner, Maastricht University, Netherlands

The Role of Gender in Adult Population Involvement in Non-formal and Informal Learning Activities

Quantitative methods,Informal learning,Workplace learning,Lifelong learning

Miren Fernandez-de-Alava, Universitat Autonoma de Barcelona, Spain; Edith Mariana Rebollar Sanchez, UAB, Spain; Carla Quesada-Pallares, University of Leeds, United Kingdom;

Continuous and lifelong learning is a need of current society ñit requires a deeper knowledge that goes beyond formal training of adults (Comision Europea, 1995; Consejo de la Union Europea, 1975; Delors, 1996; Marsick & Watkins, 1990). In fact, those learning ways that do not depend on a trainer or structured processes are increasingly usual and visible. This contribution highlights results shown in Quesada-Pallares, Fernandez-de-Alava and Rebollar-Sanchez (in press) that analyze data collected from Survey on Adult Population Involvement in Learning Activities (known by the English acronym AES), during 2011. A randomly selected sample of 17,829 Spanish adults was contacted and interviewed using the computer-assisted personal interviewing (CAPI), composed of 153 items. In this regard, our main objective is to analyze the role of gender in the involvement in non-formal and informal learning activities, identifying variables associated with these activities. Our argument is based on descriptive and inferential statistical analyses. Outcomes obtained allow us to prove that there are significant differences among gender and adult population involvement in non-formal and informal learning activities; and to establish variables that have an impact on them, especially those related to reasons for participation, age, nationality and social class. Finally, we point out the main limitations of these variables in womenís professional development and we make several proposals on the elimination of these differences.

Understanding the relation between motivation and learning during mandatory training

Quantitative methods,Attitudes and beliefs,Lifelong learning,Motivation and emotion

Anne Jacot, Universite catholique de Louvain (UCL), Belgium; Isabel Raemdonck, Universite Catholique de Louvain, Belgium; Mariane Frenay, Universite catholique de Louvain (UCL), Belgium;

The present paper aims at investigating the link between motivation and learning in a mandatory training (MT) context. Over the past decades, MT has been accepted increasingly so that workers bring up to date their professional knowledge. However, literature has largely demonstrated that the experience of choice when enrolling in a learning activity is determinant for the individualsí motivation and performance. Some authors argue that no evidence exists to indicate that enrollment ensures effective learning. Therefore, the purpose of the current research is to examine how motivation predicts actual learning in case of mandatory enrollment in training. An integrated model was developed on basis of the expectancy-value theory by Eccles and Wigfield, and the theory of planned behavior by Fishbein and Ajzen. Two studies were conducted among a specific population, namely driving-drinking offenders (N1= 114; N2 = 300) who were mandatorily enrolled in a training to prevent offenders from future drinking while driving or inversely. The participants were asked to answer self-reported questionnaires at the beginning

and at the end of the training. A multiple mediation model technique was used to test if subjective task value, a component of motivation, predicts the behavioral intention change through attitude, moral norm and perceived behavioral control. The first study showed the crucial role of subjective task value and moral norm to explain the change in behavioral intention. In the study 2, similar results to study 1 are expected. In addition, the study 2 aims at observing the link between behavioral intention and behavior.

VET workersí problem-solving skills in technology-rich environments: European approach

Quantitative methods,Educational technology,Problem solving,Vocational education

Raija Hamalainen, University of Jyvaskyla, Finland; Sebastiano Cincinnato, Ghent University, Belgium; Antero Malin, University of Jyvaskyla, Finland; Bram De Wever, Ghent University, Belgium;

The key challenge in addressing current evolutions for working life involves developing vocational skills and professional expertise that match the changing needs of society. Currently, the European workplace is challenging VET adultsí problem-solving skills in technology-rich environments (TRE). So far, no international large-scale assessment data has been available for VET. The PIAAC data comprise the most comprehensive source of information on adultsí skills to date. The present study (N=50 369) focuses on gaining insight into the problem-solving skills in TRE of adults with a VET background. Additionally, since the need for TRE problem-solving is likely to increase in the future, this study also identifies the indicators for problem-solving skills differences. When examining the similarities and differences in VET adultsí problem-solving skills in TREs across 11 European countries, two main trends can be observed. First, our results show that only a minority of VET adults perform at a high level. Second, there seems to be substantial variation between countries with respect to the proportion of VET adults that can be identified as ìat-riskî or ìweakî performers. For the future, our findings indicate the variations that can be used as a starting point to identify beneficial VET approaches. Finally, we will illuminate the models predicting problem-solving skills on the basis of theoretical assumptions as well as empirical support. In practice, the models help to develop new approaches to enable novel forms of problem-solving in technology-rich environments based on the current European workplace needs.

Examining dropout of in-service training: The role of course and learner characteristics

Quantitative methods,Goal orientation,Self-efficacy,Out-of-school learning

Katie Goeman, KU Leuven, Belgium; Luc De Grez, KU Leuven campus Brussels, Belgium; Irene Roozen, KU Leuven, Belgium;

The issue of dropout, the lack of retention of learners throughout courses or programmes, has been studied for some time in contexts of formal education. Notwithstanding its relevance to human resources management theory and practice, no framework for examining dropout among participants of in-service training exists. Literature regarding programme evaluation or the benefits and costs of training do not include studies of such kind. This paper discusses the

determinants of dropout situated at the individual and course level within a context of in-service training provided by a federal government organisation. Between 2009 and 2013 two large-scale studies were carried out in order to reveal the role of particular course characteristics (subject, language and duration), participantsí socio-demographics (gender, educational level and age) and specific aspects of their motivation (task value, self-efficacy and goal orientation). The first study built on registration information over a two-year long period (n=28074) and aimed at mapping dropout. The second, explanatory study, based on paper-and-pencil questionnaire data issued in October 2013 (n=640) was set up to scrutinize learnersí motivational dispositions behind dropout. Based on the results of several multivariate analyses, three groups of participants according to their motivational profile are distinguished, and the significant role of language, subject and duration of a course was disentangled. The findings further indicate that gender has no impact, neither do self-efficacy nor goal orientation and that task value play a decisive role in explaining dropout from in-service training. Implications of these findings for further research, theory and course development are discussed.

O 14

29 August 2015 11:00 - 12:30

Room Orange_E1

Paper Presentation

Mathematics education

Mathematics education and comprehension of text and graphics

Keywords: Quantitative methods,Student learning,Cognitive skills,Numeracy,Mathematics,Primary education,Experimental studies,Instructional design,Comprehension of text and graphics,Reading comprehension,Secondary education,Multimedia learning,Qualitative methods,Educational technology,Metacognition,Higher education,Computer-supported collaborative learning

Sig's: SIG 2 - Comprehension of Text and Graphics,SIG 20 - Computer Supported Inquiry Learning,SIG 22 - Neuroscience and Education,SIG 27 - Online Measures of Learning Processes

Chairperson: Miwa Inuzuka, Taisho University, Japan

The role of inhibition in specific arithmetic skills

Quantitative methods,Student learning,Cognitive skills,Numeracy,Mathematics,Primary education

Sarah Clayton, Loughborough University, United Kingdom; Lucy Cragg, University of Nottingham, United Kingdom; Samantha Johnson, University of Leicester, United Kingdom;

Neil Marlow, University College London, United Kingdom; Victoria Simms, University of Ulster, United Kingdom; Camilla Gilmore, Loughborough University, United Kingdom;

There is a well established relationship between childrenís overall mathematics achievement and inhibition, however very little is known about which specific aspects of mathematics involve inhibition. Seventy-seven children completed standardised assessments of mathematical achievement, inhibitory control, and non-verbal intelligence, as well as a range of experimental measures of specific arithmetic skills. Inhibition was significantly correlated with overall mathematics achievement, as well as performance on each of the specific arithmetic tasks. Regression analyses demonstrated that the relationship between inhibition and mathematics achievement was accounted for by the involvement of inhibition in basic symbolic skills such as counting, and the use of mature strategies during arithmetic.

Effects of cognitive activating tasks on literary text comprehension: An experimental study

Experimental studies,Instructional design,Comprehension of text and graphics,Reading comprehension,Secondary education

Sofie Henschel, Humboldt Universitat zu Berlin, Germany; Christel Meier, Friedrich-Alexander Universitat Erlangen-Nurnberg, Germany; Thorsten Roick, Humboldt-University of Berlin, Germany;

This experimental study investigated effects of two types of cognitive activating tasks on literary text comprehension, motivational, and affective factors. Overall, 226 9th graders from lower school tracks were randomly assigned to one of three groups. After presenting each text (two narratives, one poem), students completed cognitive-analytic (CA) or action- and production-oriented (AP) tasks followed by a test of literary text comprehension. Students in the control condition performed the reading test without these tasks. While no group differences were obtained in the content-related understanding of literary texts, students with CA tasks achieved better performances in the form-related literary text comprehension than AP and control students. In contrast, the AP group reported about a higher situational interest in the tasks and showed a slight increase in the situational empathy during the intervention compared to the CA group. Since both types of cognitive activating tasks seem to affect cognitive, motivational, and affective learning outcomes differentially, it might be worthwhile to consider a combined application for teaching literature in secondary school.

Reading comprehension and attentional processing in primary school: Do boys differ from girls?

Quantitative methods,Comprehension of text and graphics,Reading comprehension,Primary education,Multimedia learning

Halszka Maria Jarodzka, Open University, Netherlands; Bjorn de Koning, VU University Amsterdam / LEARN! Institute, Netherlands; Maria Van der Scheer, Open University of the Netherlands, Netherlands;

Reading comprehension is an essential skill for primary education and beyond. An increasing number of primary school children who perform below basic levels in reading, shows how difficult reading comprehension is. Moreover, large scale studies, such as PISA, consistently show that boys have even worse reading comprehension skills than girls. The current study investigated to which extent attentional processes can explain this gender gap. Fifty-four pupils studied four narrative texts, accompanied by a picture, for comprehension while their eye movements were recorded. Results showed that though both sexes performer equally, girls perceived less mental effort when doing so. Eye tracking analyses revealed that pupils largely stuck to the text and neglected the picture. As pictures accompanying texts in schoolbooks are often informative, this might explain part of the poor text comprehension. Furthermore, pupils, who scored low on a technical reading ability test, showed a fast and uneasy viewing behavior compared to pupils with higher abilities. This indicates that the poor ability pupils probably try to use contextual words and sentences to comprehend a word, which comes at a cost of higher perceived mental effort. Although, no sex differences were found on attentional processes, more general conclusions can be drawn for education on how to improve reading comprehension.

Calibration of computer-supported collaborative problem solving

Qualitative methods,Educational technology,Metacognition,Mathematics,Higher education,Computer-supported collaborative learning

Tarja-Riitta Hurme, University of Turku, Finland; Marjaana Veermans, University of Turku, Finland;

Advancing the understanding of collaborative problem solving requires focusing on the processes and mechanisms that shift the use of metacognition beyond the individual level to the group level. To illustrate this, pre-service primary teachersí (N = 6) mathematical problem-solving process in an asynchronous and text-based learning environment is presented in this study. The qualitative content analysis of the computer notes was used to trace calibration of metacognitive monitoring. Calibration process describes how precisely a groupís monitoring of their task knowledge and strategy knowledge and use could match the task requirements in successful problem solving. The results showed that for the calibration of task requirements and the groupís existing representation of the task to occur, it is required that (1) individual group members explain their thinking and metacognitive monitoring, (2) individual metacognitive monitoring is as precise as possible with respect to task requirements and the groupsí shared understanding of the problem, and (3) the group exercises metacognitive control when members consider each otherís suggestions and build their replies based on the previous suggestions.

O 15

29 August 2015 11:00 - 12:30

Room Brown_B5

Paper Presentation

Metacognition and reflection

Keywords: Video analysis,Metacognition,Peer interaction,Social sciences,Higher education,Cooperative/collaborative learning,Case studies,Second language acquisition,Cognitive skills,Language (Foreign and second),Primary education,Game-based learning,Self-regulation,Social interaction,Mentoring in teacher education,Reflection,Vocational education

Sig's: SIG 11 - Teaching and Teacher Education,SIG 16 - Metacognition,SIG 5 - Learning and Development in Early Childhood

Chairperson: Stefanie Golke, University of Freiburg, Germany

Portraying peer tutoring groups' evolution towards socially shared metacognitive regulation

Video analysis,Metacognition,Peer interaction,Social sciences,Higher education,Cooperative/collaborative learning

Liesje De Backer, Ghent University, Belgium; Hilde Van Keer, Ghent University, Belgium; Martin Valcke, Ghent University, Belgium;

The present study aims to investigate how metacognitive regulation is characterised during collaborative learning in a higher education reciprocal peer tutoring (RPT) setting. Sixty-four Educational Sciences students participated in a semester-long RPT-intervention and tutored one another in small groups of six. All sessions of five randomly selected RPT-groups were videotaped (70h of video recordings). Analyses are focussed on identifying time-bound evolutions in the focus of RPT-groupsí regulation behaviour, more specifically in their adoption of individually-oriented metacognitive regulation, tutor-prompted versus tutee-prompted co-regulation, and socially shared metacognitive regulation (SSMR). Multilevel logistic regression models allowing change points are adopted to study evolutions over time. The results indicate that RPT-groups significantly enhance their adoption of tutee-prompted co-regulation, as well as of SSMR, as the RPT-intervention progresses. SSMR is, moreover, increasingly demonstrated during orientation and monitoring. In contrast, decreases in tutee-prompted co-regulation and in individually-oriented metacognitive regulation are reported.

Exploring aptitude and gender effect on early foreign language learning: A case study

Case studies,Second language acquisition,Cognitive skills,Language (Foreign and second),Primary education,Game-based learning

Angeliki Lithoxoidou, University of Western Macedonia, Greece; Catherine Dimitriadou, University of Western Macedonia, Greece; Eleni Griva, University of Western Macedonia, Greece; Klio Semoglou, University of Western Macedonia, Greece;

The concept of aptitude in second/foreign language learning is considered as a factor that can significantly predict studentsí achievement. Modern trends in second/foreign language learning in early school years or even kindergarten consider aptitude of major importance for childrenís smooth immersion in the target language, as well as for teachersí awareness of their learnersí variations. This study aimed at investigating a) the correlation between language aptitude and very early foreign language learning in relation to gender, b) the way teaching procedure contributes to ameliorating young pupilsí low performance in language aptitude. For this purpose, we implemented a comparative approach of aptitude related to gender to 24 first grade children (14 boys and 10 girls) of a primary school in Florina, aged six (6). Children were initially tested for their aptitude through four cognitive tasks. Afterwards, early English language learning interventions were carried out, which lasted for five months and adopted both a topic-based and a game-based approach. The finding of the study indicated that studentsí performance in the aptitude test correlates with their ability in foreign language learning. No statistically significant differences were revealed between boys and girls either in the results of the aptitude or language test. This study provides a framework for second/foreign language teachers to support their instruction in a democratic context, promoting citizenship awareness and avoiding the reproduction of gender stereotypes.

Which regulation behaviour is shared? A study in reciprocal peer tutoring groups

Metacognition,Self-regulation,Social interaction,Social sciences,Higher education

Liesje De Backer, Ghent University, Belgium; Hilde Van Keer, Ghent University, Belgium; Martin Valcke, Ghent University, Belgium;

The present study contributes to the emerging research on socially shared metacognitive regulation (SSMR). It investigates which regulation behaviour (i.e. particular skills and low- versus deep-level approaches to regulation) is associated with SSMR. More specifically, SSMR in higher education reciprocal peer tutoring (RPT) groups is studied. All sessions of a semester-long RPT-intervention of five randomly selected RPT-groups were videotaped (70h of recordings). Binary logistic regressions are used to examine the relation between SSMR and RPT-groupsí particular regulation skills and regulative approaches. The results indicate that SSMR is significantly positively correlated with orientation and monitoring, whereas planning and evaluation are hardly socially shared. Further, deep-level metacognitive regulation is stronger associated with SSMR, as compared to low-level regulation.

Exploring reflective practice as core to mentoring pre-service teachers in school practicum

Case studies,Mentoring in teacher education,Reflection,Vocational education

Ruth Radford, University of Tasmania, Australia; Kerry Howells, University of Tasmania, Australia; John Williamson, University of Tasmania, Australia;

This paper investigates how mentors of pre-service teachers can generate deep learning and confident practice through facilitated reflection. The context for the investigation is a partnership between a Department of Education and a University which ran an intensive school placement

program from 2009 to 2013. Teachers in the placement schools were supported to consider their roles as school based teacher educators, also commonly known as ëmentorsí or ëcolleague teachersí, and encouraged to learn to be intentional about the use of this time. Through qualitative inquiry using the method of a case study and interviews, this research explores what 30 of these teachers, across 12 schools, learned about teaching ITE students. It investigates the epistemology of the classroom teacher (a voice recognized as missing in the research literature), what they know about teaching ITE students and the role of reflection in this teaching. The research question ëHow this group of mentoring teachers understood ìreflectionî and its place in teaching pre-service teachers to teach?í revealed the following themes: ï Reflection as thinking pedagogically ï Reflection and feedback ï Reflection as self directed learning; and ï Reflection on student leaning At a time when much policy that guides teacher education, in a variety of international contexts, is considering how best to meaningfully use and support the time ITE students spend in schools, our research highlights both the importance of the mentorís capacity to guide the reflective practice of ITE students, and an expanded understanding of what reflection means in this context.

O 16

29 August 2015 11:00 - 12:30

Room Cyan_F1

Paper Presentation

Metacognition and reflection

Metacognition and reflection

Keywords: Quantitative methods,Assessment methods and tools,Metacognition,Higher education,Meta-analysis,Reflective society,Student learning,Teacher professional development,Emotion and cognition,Reflection,Content analysis,Self-regulation,Experimental studies,Misconceptions,Problem solving,Social sciences

Sig's: SIG 11 - Teaching and Teacher Education,SIG 16 - Metacognition

Chairperson: Grete Arro, Tallinn University, Estonia

Should I change my answer or not? Examining answer changing through a metacognitive lens

Quantitative methods,Assessment methods and tools,Metacognition,Higher education

Agni Stylianou-Georgiou, University of Nicosia, Cyprus; Elena Papanastasiou, University of Nicosia, Cyprus;

The purpose of our study was to examine the studentís answer changing practices on multiple choice tests through the use of paradata, in relation to the studentís metacognitive processes. The sample consisted of 120 undergraduate students in education. The results of the study found that item review was to the benefit of examinees when used correctly. Answer changes that were due to question misinterpretation or misreading were more likely to be monitored well and to be corrected, which in turn improved test scores. However most answer changes that were made to the more difficult items were unsuccessful. Finally, this study has found that the studentsí confidence judgments were related to the correctness of their answers to some extent.

Next wave theorizing on reflection in educational praxis: Prerequisites and challenges to reflection

Meta-analysis,Reflective society,Student learning,Teacher professional development,Emotion and cognition,Reflection

Kaisu Malkki, University of Helsinki, Finland;

Reflection has been seen as a central notion in teacher education both for the teachers and the students. The well-known works of Dewey, Mezirow, Schon and Kolb, for example, compile into a considerable body of literature on reflection that mostly focuses on explicating the role, types, functions and goals of reflection in education. However, although the need to reflect and the potential benefits of it would be generally acknowledged, it is yet another question to actualize the process to actually reaching towards the well-known ideals, as is suggested by recent empirical research. By building on Mezirowís theory of transformative learning and Damasioís neurobiological theory on emotions and consciousness, this paper employs the methods of adaptive theory approach, rational reconstruction and conceptual analysis, to conceptualize the dynamics of reflection. It sheds light into the challenges and prerequisites of actualizing reflection. New concepts of comfort zone and edge-emotions are presented that allow explicating the challenges of reflection, the role of both positive and negative emotions in reflection as well as new possibilities for actualizing reflection. Furthermore, the role of social context, the balancing between the conceptual/cognitive and the embodied reflection in learning is discussed. The results offer deepened understanding of process of reflection with its actualities in practice. This means tools for both researchers and practitioners to make sense of what they encounter in the practices of reflection and suggests ways to move forward with ethical sensitivity if facilitating reflection and developing reflective practices is considered necessary.

Reflective learning journals: A way to foster apprenticesí reflection on workplace experiences

Content analysis,Metacognition,Reflection,Self-regulation

Jean-Luc Gurtner, University of Fribourg, Switzerland; Beat Schwendiman, EPFL, Switzerland; Laetitia Mauroux, Haute ecole pedagogique du canton de Vaud (HEP Vaud) , Switzerland;

Laetitia Mauroux, HEP Vaud, Lausanne, Switzerland, Beat A. Schwendimann, EPFL, Switzerland Jean-Luc Gurtner, Department of Education, University of Fribourg, Switzerland In

a reflective society, professionals have to maintain, update, and extend previously acquired competencies: the capacity to productively reflect on workplace experiences is fundamental and needs to be fostered from the beginning of any professional training. A Mobile and Online Learning Journal (MOLJ) was developed for Vocational Education and Training (VET) to support apprentices in capturing workplace experiences on the fly and scaffold reflection on these experiences through prompts. A current nationwide longitudinal project includes all baker and pastry chef apprentices. They use the MOLJ throughout their entire apprenticeship. The present study investigates how reflective writing, in answer to prompts in a learning journal, can promote apprenticesí use of different learning strategies as well as facilitate learning. 2í542 apprenticesí log files from three consecutive cohorts were analyzed for content and learning strategies in response to the given prompts. Professional skills were assessed through the marks obtained in the final examination. A pilot longitudinal study of two years with two samples (16 baker and pastry chefs and 22 chef apprentices) was conducted. Analysis suggests that prompts efficiently supported the use of specific learning strategies, particularly metacognitive strategies. More frequent use of metacognitive learning strategies positively correlated with better performance in the final exams. Regular feedback from workplace supervisors as well as schoolteachers stimulated and improved apprenticesí reflective writing. Extended results from the full dataset will be presented at the conference.

Metacognition during Difficult Exams: Can it be Improved?

Experimental studies,Student learning,Misconceptions,Problem solving,Social sciences,Higher education

Justin Couchman, Albright College, United States; John Vasko, Albright College, United States;

Previous research has shown that online metacognition is a good predictor of performance in college exams and a helpful guide in revising. It has also been shown that while students are good at monitoring their uncertainty while taking an exam, they are not as good at predicting or judging their performance before and after. We sought to test the effect exam difficulty has on metacognition and then attempted to improve metacognition in difficult and relatively easier exams. In our experiments, undergraduates took a difficult or relatively easier multiple-choice exam. We examined their ability to monitor their performance by collecting confidence ratings for each answer. During the exam, they rated their confidence (from 1 = low to 5 = high) for each chosen answer. Finally, they made post-test assessments of their performance and were debriefed about test-taking strategies. All participants were able to accurately monitor their performance for each question, but were significantly worse at assessing their performance before and after. Participantsí ratings also accurately predicted when they should revise, though this fact also did not translate into an accurate post-exam belief. We also examine the differences between the two groups. We then we used this exam paradigm to analyze the effects of a therapy designed to improve metacognition.

O 17

29 August 2015 11:00 - 12:30

Room Cyan_F2

Paper Presentation

Motivation

Motivation

Keywords: Quantitative methods,Developmental processes,Primary education,Motivation and emotion,Student learning,Goal orientation,Higher education,Teacher professional development,Culture,Achievement,Competencies,Self-regulation,Secondary education

Sig's: SIG 4 - Higher Education,SIG 8 - Motivation and Emotion

Chairperson: Leen Haerens, Ghent University, Belgium

Individual and Classroom Effect on Primary School Students' Self-concept in Literacy and in Math

Quantitative methods,Developmental processes,Primary education,Motivation and emotion

Kati Vasalampi, University of Jyvaskyla, Finland; Eija Pakarinen, University of Jyvaskyla, Finland; Jaana Viljaranta, University of Jyvaskyla, Finland; Minna Torppa, University of Jyvaskyla, Finland; Marja-Kristiina Lerkkanen, University of Jyvaskyla, Finland; Anna-Maija Poikkeus, University of Jyvaskyla, Finland; Jari-Erik Nurmi, University of Jyvaskyla, Finland;

According to the big-fish-little-pond effect (BFLPE) model, students compare their own academic ability with the academic abilities of their classmates, and use this social comparison impression as a basis for forming their own self-concept of ability (Marsh et al., 2007). This model has mostly been tested among adolescents and examined effect of selective school system on students' self-concept of ability. In this study, we examined whether the assumptions of BFLPE model could be found already earlier in the school career. Moreover, we applied the model to the non-selective school system and examined whether average performance level in non-selective classroom has effect on primary school studentsí self-concept in literacy and in math. This study is a part of the larger longitudinal follow-up in which almost 2000 students are followed from kindergarten to sixth grade. The subsample consisted of 504 students who are assessed three times: (1) in the third, (2) in the fourth, and (3) in the sixth grade of primary school. Their academic skills are also measured at the same time-points. The results showed, first, that individual performance in literacy and in math was a strong predictor of primary school studentsí self-concept in literacy and in math across all grades. Second, the negative BFLP effect becomes clearer during the students' primary school career and effect is present earlier among boys than among girls. The development is, however, somewhat different for literacy than for math.

Distinctiveness and relevance of mastery, appearance and normative dimensions of achievement goals

Quantitative methods,Student learning,Goal orientation,Higher education,Motivation and emotion

Marina Lemos, University of Porto, Portugal; Cristina Coelho, Universidade do Porto, Portugal; Luisa Soares, Universidade da Madeira, Portugal; Maria Teresa Goncalves, Polytechnic Institute of Viana do Castelo, Portugal;

Achievement goals have been studied in the literature over the past decades by their role in organizing and directing studentsí motivation, thereby influencing learning, achievement, and wellbeing. Within the framework of the achievement goal approach, three main goals are most frequently distinguished ñ mastery goals, performance-approach goals, and performance-avoidance goals. However, recent research has suggested the existence of a wider range of goals underlying studentsí achievement strivings. Seeking to advance this line of inquiry, this study aimed: (a) to empirically test the distinctiveness and interrelationships of a wider variety of achievement goals, including mastery, competitive, self-presentation, and simple evaluation goals (as well as the respective approach and avoidance tendencies), (b) to analyse their relative relevance for the students, and (c) to examine their differential relationships with studentsí motivation, achievement, and wellbeing. Participants were 488 university students from 17 degrees. A previously validated instrument was used to assess an extended operationalization of achievement goals. Moreover, students answered a school-related well-being scale, and a study interest questionnaire. Studentís grades were averaged as an index of their academic performance. Dimensional analysis and analysis of variance evidenced (a) the existence and prevalence of a form of evaluation-related goals, that encompass neither self-presentation nor competition, (b) separate but low incidence competitive goals, (c) a distinction between self-presentation to peers and to the teacher. The various goals showed differential relations with studentsí academic outcomes and wellbeing in the expected direction. In sum, findings confirmed hypotheses recently formulated in the goal research literature and offered some new insights.

Fostering teaching climate through training in academia: Taking a closer look at motivation

Quantitative methods,Teacher professional development,Culture,Higher education,Motivation and emotion

Julia Specht, Ludwig-Maximilians-Universitat (LMU), Germany; Angela Kuonath, LMU Munich, Germany; Daniela Pachler, Ludwig-Maximilians-Universitat (LMU), Germany; Silke Weisweiler, LMU Munich, Germany; Dieter Frey, LMU Munich, Germany;

This study examines motivation as a success factor of an innovative training program in academia aimed at impacting teaching climate. The training program includes individual-level components such as formal training as well as group-level components, i.e. participantsí in-faculty project work. In order to account for the two-level structure of the program, we focus on two facets of motivation. On an individual level, we suggest intrinsic motivation to be associated with performance. On a group-level, we suggest the motivation to benefit others to be associated with teaching climate. Next, this work examines the underlying mechanisms of these two

associations. Building on self-determination theory (Deci & Ryan, 1985) we suggest meaning as a mediating mechanism for the individual-level association. Building on literature underlining the role of identification for the emergence of group-oriented behavior (Jiang & Law, 2012), we further suggest organizational identification as a mediating mechanism for the group-level association. In a one-year longitudinal field study, 40 university teachers completed two validated questionnaires. Contrary to our hypotheses, intrinsic motivation and motivation to benefit others were not directly related to performance and teaching climate, respectively. However, by testing mediation models (Hayes, 2013) data confirmed an indirect effect of intrinsic motivation on performance through meaning. Data also confirmed an indirect effect of motivation to benefit others on teaching climate through organizational identification. Theoretical and practical conclusions can be drawn. First, the results expand current research on the understanding of motivational processes. Second, motivational facets can account for training outcomes on different levels.

Academic Achievement and Week-to-week Intrapersonal Fluctuation of Studying Efforts

Achievement,Competencies,Self-regulation,Secondary education,Motivation and emotion

Athanasios Mouratidis, Hacettepe University, Greece; Aikaterini Vasiou, University of Thessaly, Greece; Aikaterini Michou, Bilkent University, Turkey;

Implicit theories of ability ñ the degree to which one believes that ability is fixed or can be developed ñ have been associated with better studying efforts and higher academic achievement. Most of this research however has focused on interpersonal differences, while it remains unclear how implicit theories of ability predict the ongoing dynamics of studentsí academic striving. In this five-month longitudinal (diary) study, we recruited a sample of 179 high school students from Greece (35.8% males; Mage = 16.27; SD = 1.02) and investigated, after controlling for perceived competence, whether implicit theories predict grades, studying efforts, and whether they moderate the week-to-week associations between autonomous functioning and effort regulation and homework procrastination for six consecutive weeks. Multilevel analyses showed that beliefs that ability is fixed predicted poorer grades, lower mean levels of studying efforts and higher homework procrastination; these beliefs were found to moderate also the week-to-week associations between autonomous functioning and studying efforts and homework procrastination. In particular, autonomous functioning co-varied positively to effort regulation and it was not related negatively to homework procrastination only among students who believed that ability is malleable and can be developed. A path model further indicated that aggregate scores of effort regulation mediated the relation between entity beliefs and grades. The results are discussed within the implicit theory framework and self-determination theory.

O 18

29 August 2015 11:00 - 12:30

Room Yellow_G3

Paper Presentation

Reading comprehension

Keywords: Comparative studies,Quantitative methods,Educational policy,Literacy,Reading comprehension,Learning in context,Second language acquisition,Language (Foreign and second),Primary education,Multicultural education,Attitudes and beliefs,Motivation and emotion,Experimental studies,Special education,Learning disabilities,Writing/Literacy

Sig's: SIG 1 - Assessment and Evaluation,SIG 15 - Special Educational Needs,SIG 21 - Learning and Teaching in Culturally Diverse Settings,SIG 8 - Motivation and Emotion

Chairperson: Catherine Dimitriadou, University of Western Macedonia, Greece

Student Reading Achievement in PIRLS 2011: School and Students Factors

Comparative studies,Quantitative methods,Educational policy,Literacy,Reading comprehension,Learning in context

Patricia Dinis Mota da Costa, European Commission - Joint Research Centre, Italy;

The purpose of this study was to examine the relationship between student and school literacy knowledge and practices and reading achievement in PIRLS 2011. Following a home literacy model and a school effectiveness framework, our analysis focuses on opportunities to learn at home and at school in EU countries ñ Denmark, Sweden and France - with different scores. The multilevel model with student and school levels indicates that 20%, 30% and 31% of the total variance in reading achievement is explained in Denmark, Sweden and France, respectively. In accord with the home literacy model, we found that, in all countries, studentsí literacy knowledge (alphabet) and practices (book reading) before compulsory school impact their achievement. Similarly, students with higher home resources for learning and students who like reading perform better in reading. At the school level, the average of home resources for learning also showed an increase in reading scores while studentsí engagement in reading was statistically significant only in Sweden. Thus, results suggest that the home literacy model variables are positively related to studentsí achievement regardless of the reading achievement of the country. We also found a school compositional effect whereby students in schools with a higher socio-economic intake, as measured by home resources for learning, have higher achievement. Moreover, in Sweden, students engagement in reading, which captures whether they like what they read in school and think their teachers give them interesting materials to read, makes a difference in achievement. Policy implications can be addressed in order to improve equity.

Can proficiency in everyday language and proficiency in academic language be differentiated?

Quantitative methods,Second language acquisition,Literacy,Language (Foreign and second),Primary education,Multicultural education

Birgit Heppt, Humboldt-Universitat zu Berlin, Germany; Sofie Henschel, Humboldt Universitat zu Berlin, Germany; Nicole Haag, Humboldt-Universitat zu Berlin, Germany;

The mastery of academic language is assumed to be particularly important for academic achievement. Moreover, gaining proficiency in academic language is considered especially challenging for language minority students even if they have reasonable skills in everyday language. Despite these assumptions, little empirical investigation has been devoted to the question of whether understanding everyday language and academic language represent different facets of language comprehension. The present study examines whether proficiency in everyday language and proficiency in academic language can be differentiated from each other. To test for construct validity, we additionally consider (1) the relationships of everyday language and academic language with mathematical skills as an indicator of academic achievement and (2) performance differences in everyday language and academic language between different language groups (German, Turkish, other). Based on data from a nation-wide reading comprehension test conducted in German elementary schools in grade 4 (N = 25,776), we found that everyday and academic language proficiency can be differentiated from each other empirically, with academic language proficiency being more highly correlated with mathematical skills than everyday language proficiency. While students with Turkish language background were substantially hampered in their comprehension of both everyday and academic language, students with other home languages lagged behind their monolingual German peers only in terms of their academic language proficiency. When controlling for studentsí sociocultural resources, the group-specific performance differences in both everyday and academic language proficiency disappeared. The implications of these results for core assumptions on academic language will be discussed.

Gender-specific vocabulary in elementary school depending on migration background

Quantitative methods,Second language acquisition,Attitudes and beliefs,Reading comprehension,Primary education,Motivation and emotion

Wahiba El-Khechen, TU Dortmund University, Germany; Nele McElvany, TU Dortmund University, Germany; Ilka Wolter, Free University Berlin, Germany; Ursula Kessels, FU Berlin, Germany;

Vocabulary plays a substantial role in the development of educational performance. Findings on the importance of gender stereotypes suggest that children could have different knowledge about female and male connoted words depending on their gender. It is also expected that these gender differences in childrenís vocabulary could appear more in students with immigrant background, as previous research indicates that students in families with immigrant background have a more traditional gender-role orientation. A sample study of 371 elementary school children (121 students without migration background and 249 with migration background) in grade 4 is presented. Based on pedagogical-psychological theoretical assumptions, words from a standardized vocabulary test were previously categorized as connoted with maleness, femaleness or gender neutrality. As expected, results of a MANOVA revealed that boys had a vocabulary advantage with male-associated words, girls an advantage with female-associated words and a comparable vocabulary of both sexes with words deemed neutral. These gender specific,

qualitative differences in the vocabulary occurred particularly in children with an immigrant background who not only have a lower overall vocabulary, but also a vocabulary more differentiated by gender than children from a German language family. The findings regarding differential vocabulary skills are discussed in terms of their significance for educational practice and research.

Effects of a randomised reading intervention study aimed at 9-year olds: A 5-year follow-up

Experimental studies,Special education,Learning disabilities,Reading comprehension,Writing/Literacy

Ulrika Wolff, University of Gothenburg, Sweden;

A Swedish multi-component intervention program was developed and implemented in a randomised intervention study for 9-year olds in Grade 3. Participants in the reading intervention study were identified as poor readers based on a screening battery (N=2 212) by the end of Grade 2.The intervention group (n=57) received 40 minutes of one-to-one instruction per day for twelve weeks. The control group (n=55) took part in ordinary classroom activities. Previously analyses using structured equation modelling showed that the intervention group performed significantly better than the control group on spelling, reading speed, reading comprehension and phoneme awareness at the immediate post-test with sustained effects one year later. The present study reports on a 5-year follow-up when students are in Grade 8. Preliminary analyses show that there are no significant differences between the intervention group and the control group on working memory, vocabulary, spelling, reading speed and reading comprehension. However, the intervention group performed significantly better than the control group on word decoding. There was also a significant interaction effect of group assignment and initial word decoding, in the way that the lowest performing students benefitted the most from the intervention. A group of typically developing students (n = 66) outperformed the students identified as poor readers in Grade 2, on working memory, vocabulary, spelling, reading comprehension and word decoding.

O 19

29 August 2015 11:00 - 12:30

Room Brown_B6

Paper Presentation

School effectiveness

School effectiveness

Keywords: Mixed-method research,Qualitative methods,Quantitative methods,School effectiveness,Primary education,Secondary education,Cognitive development,Educational attainment,Teaching/instruction,Achievement

Sig's: SIG 18 - Educational Effectiveness,SIG 23 - Educational Evaluation, Accountability and School Improvement

Chairperson: Katharina Maag Merki, University of Zurich, Switzerland

Networks for school support and improvement: A mixed methods study

Mixed-method research,Qualitative methods,Quantitative methods,School effectiveness,Primary education,Secondary education

Ariel Lindorff-Vijayendran, University of Oxford, United Kingdom;

This paper presents findings from a mixed-methods study of school support networks in New York City. These networks, which were designed to act as a school improvement mechanism, provide a range of different types of support for schools, such as teacher and leadership development, curriculum, support for particular groups of students, operations, budgeting assistance, and facilitating inter-school collaboration. Each school must choose to affiliate with one of nearly 60 networks, and schools also belong to a geographical district that largely influences student intake. Within this context, the aims of the study are to: 1) Determine whether there is evidence of significant variation in student attainment between/within networks, or of differential effects of networks or schools for different groups of students (e.g. based on ethnicity or intake ability), and 2) Explore processes/interactions within the network structure for school support, accounting for perspectives of multiple stakeholders (principals, teachers, and network staff). The first aim is addressed using multilevel modeling of secondary data (including state assessment scores and biographical data, with 8th grade scores as outcomes and 5th grade scores as prior attainment measures). The second aim is addressed using qualitative approaches including semi-structured interviews with principals, teachers and network staff in a purposive sample of 10 schools of varying levels of performance based on the quantitative analysis. The present paper focuses on links between selected findings relevant to these two aims, contributing to the relatively limited body of mixed methods literature incorporating advanced, rigorous quantitative methods.

The impact of class composition on the development of primary school studentsí cognitive competence

Quantitative methods,School effectiveness,Cognitive development,Educational attainment,Primary education

Sirkku Kupiainen, University of Helsinki, Finland; Risto Hotulainen, University of Helsinki, Finland; Mari-Pauliina Vainikainen, University of Helsinki, Finland; Jarkko Hautamaki, Helsinki University, Finland;

Arguments regarding tracking, streaming, or ability grouping often rest on a perceived trade-off between equity and efficiency. The central argument for tracking is that homogeneous classrooms permit a focused curriculum and appropriately paced instruction, leading to better learning for all. Arguments for ungrouped classrooms centre on the concern that lower ability

students will be disadvantaged by less ideal learning environments regarding teacher proficiency, curricular content, and peer effect. Drawing on a longitudinal data of 600 students, the present study focusses on the role of peer effect or class composition on the development of primary studentsí cognitive competence through the six years of Finnish primary education. Building on previous modelling of the development of the studentsí cognitive competence from grade 1 to grade 6 at the individual level, the study uses latent growth curve modelling to look at the role of class composition as exemplified by studentsí curricular attainment, cognitive competence, motivational attitudes, and SES) and of class size on the development of individual studentsí competence and motivation. The study will make an important contribution to the literature regarding the role of class composition and class size as means for fostering academic achievement and educational equity.

Measuring Instructional Quality in Physical Education Lessons: Insights from an Exploratory Study

Quantitative methods,School effectiveness,Teaching/instruction,Primary education

Charalambos Charalambous, University of Cyprus, Cyprus; Leonidas Kyriakides, University of Cyprus, Cyprus; Niki Tsangaridou, University of Cyprus, Cyprus; Ermis Kyriakides , University of Cyprus, Cyprus;

Heightened accountability pressures over the past years, as well as an increased emphasis on the role of instruction in student learning have directed scholarly attention to scrutinizing instructional quality. Recent years have also seen concerted efforts to develop theoretical frameworks that capture instructional quality as well as different measurement approaches to gauge it. Unlike prior studies that have mostly focused on ìcoreî subject-matters, such as language arts or mathematics, in this exploratory study we focus on Physical Education. Using a modified version of the Task Structure System observational instrument, we attempted to determine the optimal lesson-rater combination needed to yield sufficiently reliable estimates of instructional quality. Toward this end, we recruited a sample of 25 Cypriot generalist teachers who were teaching Physical Education to the upper three grades of primary education. Each teacher was observed three times by two raters, trained to capture instructional quality using the aforementioned instrument. Drawing on generalizability-theory, we decomposed the variance observed in the teachersí lessons into different facets, and by employing a series of D-studies, we determined the optimal combination of lessons to be observed by each teacher and the number of raters that need to observe these lessons. Our findings suggest that this combination differs across different aspects of instruction under consideration. The study findings have implications for the design of observational systems developed to capture and evaluate instructional quality in Physical Education.

How principalsí use of student achievement data affects quality improvement in schools

Quantitative methods,School effectiveness,Teaching/instruction,Achievement,Secondary education

Tanja Graf, Freie Universitat Berlin, Germany; Barbara Muslic, Freie Universitat Berlin, Germany; Harm Kuper, Freie Universitat Berlin, Germany;

As key components of test-based school reforms in Germany, national standards in education and standard based mandatory performance tests in 8th grade were implemented. Feedback information on studentsí achievement based on these state-wide tests is meant to serve as basis for principals and teachers to improve quality of instruction and school. The implementation of this evaluation instrument within the low-stakes context in Germany has been investigated by a series of studies (in summary: Maier & Kuper 2012). However, there is still a lack of research regarding the principalsí data use and the responsibility within the school staff to conduct improvement measures. Principals actions towards improvement of school processes affect teaching staff (teachers, heads of departments) and therefore indirectly student achievement. The question of how principals implement strategies in the context of data-based school reform is investigated by a survey (N=114 principals). The study design includes the matching of achievement data with the survey data in order to explore the relationship between the improvement strategies (measures to improve quality of instruction and schools) and student achievement. We found different patterns of data use by the teaching staff and principals. Teachers are more responsible for improvement of instruction and principals for activities at school level. The relationship between studentsí achievement and data use at instructional level is moderate.

O 20

29 August 2015 11:00 - 12:30

Room Green_A7

Paper Presentation

Self-regulation

Self-regulation

Keywords: Quantitative methods,Student learning,Literacy,Self-efficacy,Self-regulation,Secondary education,Professions and applied sciences,Vocational education,Motivation and emotion,Emotion and affect,Experimental studies,Assessment methods and tools,Primary education

Sig's: SIG 1 - Assessment and Evaluation,SIG 14 - Learning and Professional Development,SIG 8 - Motivation and Emotion

Chairperson: Chaya Herman, University of Pretoria, South Africa

Prediction of academic resilience of a high-performing, high-equity economy in PISA 2012

Quantitative methods,Student learning,Literacy,Self-efficacy,Self-regulation,Secondary education

Kwok-cheung Cheung, University of Macau, Macau; Man Kai Ieong, University of Macau, Macau; Pou Seong Sit, University of Macau, Macau;

According to a conceptual model of self-regulated learning (SRL), this paper seeks to base on the four facets of SRL (i.e. self-beliefs, value and affection, prior knowledge, and invested efforts and work ethics) in mathematics for OECDís Programme for International Student Assessment PISA 2012 Study to predict academic resilience of the home disadvantaged students in Macao, which is a high-performing high-equity PISA participating economy. The findings and implications are clear: The high quality and equity of Macaoís mathematics basic education may be attributed to the possession of favorable SRL dispositions and demographic characteristics of the academic resilient students, who measured by PISAís index of Economics, Social, and Cultural Status (ESCS) are regarded home disadvantaged. Compared with their ESCS-advantaged counterparts, these students are better equipped with prior knowledge for the self-regulation of cognition, have higher intrinsic motivation and are more self-efficacious in their mathematics studies for the self-regulation of motivation, as well as have better mathematics work ethics for the self-regulation of behaviors and the schooling contexts.

How Does Apprenticesí Affective Occupational Commitment Develop during Training?

Quantitative methods,Student learning,Professions and applied sciences,Vocational education,Motivation and emotion

Patrizia Salzmann, University of Teacher Education St.Gallen, Switzerland; Simone Berweger, University of Teacher Education Zurich, Switzerland;

In this paper we investigate the development of affective occupational commitment (AOC) during vocational education and training (VET) within a dual-track training system. Based on self-determination theory and theory of vocational choice we explore how different development trajectories can be explained and how apprenticesí AOC is related to VET program outcomes. Longitudinal data from a sample of 497 Swiss apprentices in healthcare, social care and construction is used to perform linear latent growth curve analyses. Initial AOC was associated with apprenticesí perceived fit of the VET program and their experience of competence during in-company training. AOC slightly decreased over time. Change in AOC was associated with apprenticesí experience of competence and autonomy in in-company training. Satisfaction with the apprenticeship and turnover intention were both related to initial AOC. Change in AOC was related to satisfaction with the apprenticeship. No association of initial AOC or change in AOC with performance at vocational school was found. The results contribute to a better understanding of AOC development during training and help clarify the underlying mechanisms driving these changes. They highlight the importance of AOC development as a predictor of VET outcomes, which are considered to be relevant for post-training professional performance and learning processes.

Effects of home background on mathematics performance: A multilevel analysis of SRL processes

Quantitative methods,Student learning,Emotion and affect,Literacy,Self-regulation,Secondary education

Man Kai Ieong, University of Macau, Macau; Kwok-cheung Cheung, University of Macau, Macau; Pou Seong Sit, University of Macau, Macau;

In accordance with a conceptual model of self-regulated learning (SRL), this paper seeks to base on the four facets of SRL (Self-beliefs, Value and affection, Prior knowledge and Perseverance) in mathematics for OECDís Programme for International Student Assessment 2012 Study to uncover the underlying mediational mechanisms explaining the effect of economics, social and cultural status (ESCS) on mathematics literacy performance of 15-year-old students in Macao. The SRL mediational effects at the ìbetween-schoolî and ìbetween-student within-schoolî levels are analyzed. Research results show that there are four salient SRL variables (i.e. mathematics self-efficacy, mathematics intrinsic motivation, familiarity with mathematics concepts and mathematics work ethics) are able to mediate the ìbetween-student within-schoolî effect of ESCS on student mathematics literacy performance. Amongst these four there is one variable, namely mathematics self-efficacy able to mediate fully the ìbetween-schoolî effect of ESCS on student mathematics literacy performance. The research implication clear: By devising mathematics education programs with a bearing on the four facets of SRL in mathematics and due attention paid to the peer effects in mathematics group activities teachers can help raise student mathematics literacy performance across ESCS levels, and simultaneously narrow the ESCS gap in mathematics literacy performance. The significance of this study is that the ESCS gap in mathematics literacy performance is no longer a thorny issue that cannot be curbed through studentís regulation of his/her cognition, motivation, behavior and context. The findings inform policies regarding closing of the ESCS gap in mathematics literacy performance favoring students of the higher ESCS family in Macao.

Longitudinal effects of formative assessment on young adolescentsí self-regulation

Experimental studies,Assessment methods and tools,Student learning,Self-regulation,Primary education,Secondary education

Kelly Meusen, Open University, Netherlands; Desiree Joosten-ten Brinke, Open University of the Netherlands, Netherlands; Els Boshuizen, Open University, Netherlands;

This paper presents the results of a formative assessment intervention in primary education and its long-term impact on the development of studentsí levels of self-regulation, motivation, and self-efficacy after their transition to secondary education. Participants in the study included 695 Dutch sixth graders from 17 schools. A longitudinal design with three measurements on three time points was adopted. The first part of the study, consisting of a pretest, the intervention, and posttest, was conducted during the studentsí last seven months in primary education using two experimental conditions and a control condition. Formative assessment intervention lessons included peer or self-assessment on writing assignments. Students in the control condition did

the same writing assignments without specific instruction in formative assessment and developing self-regulation strategies. A follow-up took place 10 weeks later, after the summer vacation and at the commencement of the participantsí secondary education. The following research questions were addressed. What are the effects of the formative assessment intervention on the development of self-regulation and external regulation over time? What are the effects of the formative assessment intervention on the development of intrinsic and extrinsic motivation over time? What are the effects of the peer- and self-assessment interventions on self-efficacy over time? Longitudinal multilevel analyses showed that the development of self-regulation and motivation is significantly positively associated with the formative self- and peer-assessment interventions and continues over time ($p < .05$). Self-efficacy was significant positively associated with the self-assessment intervention. No significant differences were found on extrinsic regulation and extrinsic motivation.

O 21

29 August 2015 11:00 - 12:30

Room Brown_B7

Paper Presentation

Teacher professional development

Teacher professional development

Keywords: Experimental studies,School effectiveness,Cognitive skills,Comprehension of text and graphics,Higher education,Qualitative methods,In-service teacher education,Instructional design,Pre-service teacher education,Teacher professional development,Interdisciplinary,Primary education,Workplace learning,Case studies,Mixed-method research

Sig's: SIG 11 - Teaching and Teacher Education,SIG 14 - Learning and Professional Development

Chairperson: Christina Chinas, University of Cambridge, Cyprus

Structured Briefs Help to Communicate Research More Efficiently to Practitioners

Experimental studies,School effectiveness,Cognitive skills,Comprehension of text and graphics,Higher education

Andreas Hetmanek, Ludwig-Maximilians-Universitat (LMU), Germany; Christof Wecker, Ludwig-Maximilians-Universitat (LMU), Germany; Kati Trempler, University of Wuppertal, Germany; Jan Kiesewetter, Munich University Hospital, Germany; Cornelia Grasel, University of Wuppertal, Germany; Martin R. MRGFischer, Munich University Hospital, Germany; Frank Fischer, Ludwig-Maximilians-Universitat (LMU), Germany;

Evidence-based practice requires efficient communication of research findings to practitioners. Stand-alone structured briefs of empirical journal articles constitute a potentially helpful vehicle for communicating primary research to practitioners in an accessible way. In a two-part experiment, we compared original full-length articles to structured briefs with respect to text comprehension, cognitive load, and subjective task difficulty and analysed to which extend these effects depend on the language of the structured brief (native vs. foreign language). In part one the original full-length articles were written in German, and in part two they were written in English. Data were collected from 48 German pre-service teachers. The results indicate that structured briefs can increase text comprehension and reduce cognitive load and subjective task difficulty. This pattern of results was found for both native language and foreign language original research articles. The language of the structured briefs did not moderate these effects. Thus, structured briefs of empirical journal articles qualify as a means to efficiently communicate research to practitioners.

Developing pedagogical content knowledge: Lessons learned from intervention studies

Qualitative methods,In-service teacher education,Instructional design,Pre-service teacher education,Teacher professional development,Interdisciplinary

Marie Evens, KU Leuven, Belgium; Jan Elen, KU Leuven, Belgium; Fien Depaepe, KU Leuven, Belgium;

Pedagogical content knowledge (PCK) positively impacts teaching quality and student learning. Therefore, intervention research on PCK development in (prospective) teachers is highly relevant. The present study reviews intervention studies aiming at PCK development. Based on a search in two databases (ERIC, WoS), a systematic review is conducted, focusing on three research questions: (1) How are the studies designed?, (2) How are the interventions designed?, and (3) What elements of interventions contribute to PCK development? The results show that most intervention studies are conducted in math and sciences education. A qualitative methodology is most frequently used. Drawing conclusions about effective elements is difficult due to the lack of contrast between effective and non-effective interventions. Especially the possibility for reflection and the presence of an expert are found to be important conditions to improve PCK. However, most intervention studies on PCK show methodological flaws. Guidelines for further research are provided.

Mentor teachersí practical arguments for intervening during student teachersí lessons

Qualitative methods,Teacher professional development,Primary education,Workplace learning

Frans Prins, Utrecht University, Netherlands; Paulien Meijer, Radboud University, Netherlands; Theo Wubbels, Utrecht University, Netherlands; Marieke Jaspers, Utrecht University, Netherlands;

Recently, Jaspers, et al. (2014) showed that for mentor teachers (MTs) combining mentor and teacher roles is quite difficult, particularly because mentor goals and teacher goals might conflict. To get more insight in MTsí actions and considerations during student teachersí (STs)

practice, the present study aimed to examine MTsí reasoning and decision process on intervening during STsí lessons. Fenstermachersí practical argument, consisting of situational, value, empirical and stipulative premises, and an intended or actual action (Fenstermacher & Richardson, 1993), was used to describe teachersí reasoning process. The research question was: What are mentor teachersí practical arguments for their intervening during student teachersí lessons in primary education? Eighteen MTs in primary education were interviewed about combining the mentor and teacher roles during STsí lessons. The interviews were analyzed on practical arguments and their premises (situational, value, empirical/stipulative) and actions. Results showed that all teachers mentioned a basic practical argument, that is, all MTs want their STs to practice, and MTs have the intention not to intervene during STsí teaching. However, when MTs experience serious situation breakdowns, teacher values and specific knowledge overrule the mentor values and their general knowledge that caused MTs first intend not to intervene. We conclude that eventually teacher values are stronger than mentor values. MTs are, in the end, more concerned about pupilsí well-being than STsí learning, and therefore they intervene. The double role as mentor and teacher seemed to be a more complicating factor than was reported in previous research (e.g., Post, 2007; Wang, 2010).

Effects of an intervention for data-based decision making on teacher professional development

Case studies,Mixed-method research,School effectiveness,Teacher professional development

Johanna Ebbeler, University of Twente, Netherlands; Cindy Poortman, University of Twente, Netherlands; Kim Schildkamp, University of Twente, Netherlands;

Schools are increasingly expected to use data for school improvement. However, educators struggle with the use of data (e.g. data-based decision making). Professional development in this area is needed. Therefore, we designed and implemented a professional development program for data use: the data team procedure. This study focuses on the effects of the data team procedure in ten schools. We studied the effects with regard to (1) the satisfaction of teachers with the procedure, (2) attitude, knowledge and skills with regard to data use, (3) use of knowledge and skills, and (4) improved student achievement. A mixed-methods study, using questionnaires, data literacy assessments, and interviews, showed that the participants are satisfied about the professional development program. Also, we found that teachers scored significantly higher on the data literacy assessment compared to the pre-test. The results for using knowledge and skills and improved student achievement were mixed. Some teachers reported using data in their own practice, but several teachers indicated that they did not use data in their own practice (yet). In the paper and presentation we will further discuss the content of the data team procedure, the methodology used to study the effects of the data team procedure, as well as the effects found. The data team procedure is a promising type of support.

O 22

29 August 2015 11:00 - 12:30

Room Yellow_G2

Paper Presentation

Technology-enhanced learning

Technology-enhanced learning

Keywords: Case studies,Assessment methods and tools,E-learning/ Online learning,Higher education,Learning analytics,Educational technology,Learning approaches,Social sciences,Computer-assisted learning,Instructional design,Vocational education,Multimedia learning,Qualitative methods

Sig's: SIG 1 - Assessment and Evaluation,SIG 4 - Higher Education,SIG 7 - Learning and Instruction with Computers

Chairperson: Bart Rienties, Open University UK, United Kingdom

ICT as a Facilitator of Self- and Peer Assessment: The case of EvalCOMIX

Case studies,Assessment methods and tools,E-learning/ Online learning,Higher education

Maria Soledad Ibarra Saiz, University of Cadiz, Spain; Gregorio Rodriguez Gomez, Universidad de Cadiz, Spain;

This study describes an e-assessment experience undertaken at a Spanish university. Students from 2 separate cohorts taking the Project Management module within the Faculty of Economics and Business undertook e-self-assessment and e-peer assessment, using the web-based programme EvalCOMIXÆ. The aim of the study was to identify to what extent students of business administration and management valued web-based technological resources designed for assessment and their opinion of participative forms of e-assessment, such as self- and peer assessment. Four assessment tasks were designed for students to undertake during one semester. For each task students had to hand in a piece of work or undertake an assignment to be assessed. At the end of the assignment the students were asked their opinion on the exercise. The results of this survey among 108 students showed, firstly, that they valued both e-self-assessment and e-peer assessment highly. Secondly, it showed that students found these e-assessment formats very useful for the development of skills such as the application of knowledge, arguing a point, problem solving, analysing information, communication, autonomous learning, ethical considerations, creativity, group working, critical and analytical judgement and decision-making.

Spacing and cramming in webcast usage: A learning analytics approach

Learning analytics,Educational technology,Learning approaches,Social sciences,Higher education,Computer-assisted learning

Bas Giesbers, Rotterdam School of Management, Erasmus University, Netherlands; Peter van Baalen, University of Amsterdam, Netherlands; Jan van Dalen, Rotterdam School of

Management, Erasmus University, Netherlands; Martijn Flipsen, Rotterdam School of Management, Erasmus University, Netherlands;

We investigated studentsí usage behaviour of two types of webcasts (recorded lectures and worked assignments) (N = 873) in terms of spacing and cramming behaviour and related this to student performance. In doing so, we also aim to demonstrate three learning analytics methods that extend beyond hit frequencies. Initial results show that viewing patterns of both types of webcasts are equally related to the exam grade. Spreading the views of either lecture recording or worked assignment webcasts in the period before the exam seems to be positively related to exam performance. A learning analytics approach by using objective usage data provides new insights which can be used by staff to improve the educational design.

Learning and teaching with hypervideos: A literature review

Educational technology,Instructional design,Vocational education,Multimedia learning

Florinda Sauli, Swiss Federal Institue of Vocational Education and Training (SFIVET), Switzerland; Alberto Cattaneo, Swiss Federal Institute for Vocational Education and Training, Switzerland; Carmela Aprea, Friedrich-Schiller-University Jena, Germany;

The use of video for educational purposes plays an important role in contemporary societies. Videos, indeed, can promote learning by reproducing real experiences, visualizing dynamic processes, and combining diverse symbol systems into coherent media messages. In line with that, hypervideos represent a further step to overcome the limitations of videos for learning. Videos, in fact, can promote learning, although it does not necessarily enable students to actively interact the content and, by then, to self-regulate their learning. With hypervideos it is possible to overcome this limitation. Prior research also points out the benefits of hypervideos in fostering cognitive, meta-cognitive and social skills. However, if a wide range of literature about the use of videos in learning currently exists, the concept of ìHypervideoî is less represented in the scientific literature. The aim of this research is then to investigate the value of hypervideo for educational purposes, especially in the context of Vocational Education and Training. We selected 42 papers from an extensive search of the literature from 2000 onwards. Keywords included specifically ìHypervideoî and ìInteractive videoî. Preliminary results show that: 1) the focus is on experimental studies and less on field studies, 2) learning by design is considered an effective strategy when using hypervideos, especially to foster innovative and creative thinking and, 3) the VET context is not represented at all.

Accelerated Educational Change with Technology in Initial Teacher Training Programmes

Case studies,Qualitative methods,Educational technology,Higher education

Jos Fransen, Inholland University of Applied Sciences, Netherlands; Pieter Swager, Inholland University, Netherlands; Jeroen Bottema, Inholland University of Applied Sciences, Netherlands;

Educational change may be enhanced by stimulating educational change in Teacher Training Programmes. Therefore, a project was started to accelerate educational change with technology in Initial Teacher Training Institutes. Teacher trainers volunteered to experiment with technology in their educational practices. Two projects were evaluated to establish the perceived effects of the projects on the innovation power of teacher trainers, the team of teacher trainers, and the Initial Teacher Training Institute. Teacher trainers and students participating in the experiments were interviewed, as well as team members who did not participate, the project leaders, and the management of the Institute. Additionally, questionnaires were used in the second project and this project was evaluated at mid-term and after completion. All interviews were recorded and transcribed and findings were analysed in the perspective of a theory-based model for innovation power. Results confirmed the relevance of the theory-based model and showed the perceived effects of the project on the teacher trainers and the Programme. The evaluation revealed a schism between the early adopters who volunteered and team members who did not volunteer for participating in the project, and this schism tends also to widen during the project. This schism may inhibit the increase of the innovation power of the team of teacher trainers and the Initial Teacher Training Institute.

O 23

29 August 2015 11:00 - 12:30

Room Blue2_D2

Paper Presentation

Workplace learning

Workplace learning

Keywords: Attitudes and beliefs,Culture,Interdisciplinary,Informal learning,Vocational education,Lifelong learning,Case studies,Mixed-method research,Professions and applied sciences,Workplace learning,Learning in context,Ethnography,Researcher education,Social sciences,Doctoral education

Sig's: SIG 14 - Learning and Professional Development,SIG 24 - Researcher Education and Careers

Chairperson: Kaisa Hytonen, University of Turku, Department of Teacher Education, Finland

The perception of learning culture and its dependence on individual beliefs

Attitudes and beliefs,Culture,Interdisciplinary,Informal learning,Vocational education,Lifelong learning

Christoph Fischer, University of Paderborn , Germany; Eva Kunze, University of Paderborn, Germany; Christian Harteis, University of Paderborn, Germany;

The work presented aims to investigate the interrelation between individual beliefs and the perception of the learning culture of organizations. Organizational learning culture describes all values and actions concerning the field of learning in an organization. As measurement of the organizational learning culture is usually based on employee surveys, this work argues that therefore it is the employees` perception of learning culture that is commonly identified through research. From research in educational settings it is known that epistemic beliefs influence the perception of learning environments. Thus the perception of learning culture should also be influenced by the epistemic beliefs of the employees.

Examination of feedback practices in a workplace environment: A mixed-method case study

Case studies,Mixed-method research,Professions and applied sciences,Informal learning,Workplace learning,Learning in context

Styliani Bellou, Ludwig-Maximilians-Universitat (LMU), Germany; Jan-Willem Strijbos, Ludwig-Maximilians-Universitat (LMU), Germany;

The present study explored informal feedback practices in the workplace. Situational aspects of the feedback context appear to play a central role in daily feedback practices at the workplace. Recent findings indeed suggest that employees learn from informal daily interaction with colleagues, but a comprehensive understanding of feedback practices in workplace contexts is missing. This study aims to explore informal feedback practices at the workplace: one the one hand through overall feedback orientations and perceptions, and on the other hand through in-situ perceptions and expectations of feedback. A mixed-method case study was conducted with employees of a service provider company (N=20). Employees completed two surveys covering the overall feedback orientation and perceptions of the feedback environment before providing daily feedback reports for a period of 10 working days. Afterwards they were interviewed. Non-parametric correlations were conducted for the quantitative data and cross-case matrices for the qualitative data. Results showed significant relations between aspects of employeesí feedback orientations and perceptions for both senior and junior employees, as well as differences between both subgroups. Perceptions of in-situ feedback (daily reports) revealed that juniors associated perceived adequacy of feedback relatively stronger with willingness to improve compared to seniors, which signals that in-situ feedback perceived as adequate in particular motivates juniors. When interviewed, both subgroups mentioned higher feedback expectations from supervisors, but juniors were more elaborate regarding the type of feedback they expected. This study illustrates the contextualized nature of workplace feedback and provided some first insights into in-situ informal feedback practices.

Disciplinary identity and early-career social scientists: Changing allegiances and practices

Ethnography,Researcher education,Social sciences,Doctoral education,Workplace learning

Janice Malcolm, University of Kent, United Kingdom; Miriam Zukas, Birkbeck, University of London, United Kingdom;

Academic work in the social sciences remains one of the least-researched fields of professional practice. This paper draws on a project which utilised a sociomaterial approach to investigate the everyday practices of academic work in social science disciplines, and the ways in which the complex relationships between the discipline, the department and the university are enacted in these practices. The relatively unusual methodology of the study, which involved tracing the work of multiple actors and practices (social, material, technological, pedagogic, symbolic) in everyday disciplinary activities, is explained in detail. Using the individual as the way in to the work setting, we were able to construct an account of the complex interrelationships and interactions of the multiple actors in each department, university and discipline. Here we present selected findings of particular significance for early-career academics, focusing on the increasingly individualised practices of academic work among younger social scientists. Finally we discuss the disciplinary implications of these findings for doctoral and early-career education.

Investigation of School-to-work Transition and Career Progress of WorldSkills Competition Medalists

Vocational education,Workplace learning,Learning in context,Lifelong learning

Laura Pylvas, University of Tampere, Finland; Petri Nokelainen, University of Tampere, Finland;

This study investigates school-to-work transition and development of work career of past WSC gold, silver or bronze medal winners. It also examines how they see the transferability of skills and competences from VET and WSC into working life. Total number of 54 semi-structured theme interviews were conducted in 2013-2014 to the past Finnish WSC medal winners (n=18) who have entered the working life (1 to 15 years of work experience). In addition, also their employers (n=16) and colleagues (n=16) from the same workplace and vocational field were interviewed. According to results, WSC medalists reported higher level of expertise and useful contacts, and easier school-to-work transition than the control group members did.

O 24

29 August 2015 11:00 - 12:30

Room Blue1_C1

Paper Presentation

Assessment methods and tools

Assessment methods and tools

Keywords: Design based research,Mixed-method research,Pre-service teacher education,Social aspects of learning,Communities of practice,Cooperative/collaborative learning,Comparative studies,Assessment methods and tools,Technology,Primary education,Secondary

education,Computer-assisted learning,Quantitative methods,School effectiveness,Teacher professional development,Communities of learners,Experimental studies,Achievement

Sig's: SIG 1 - Assessment and Evaluation,SIG 11 - Teaching and Teacher Education,SIG 14 - Learning and Professional Development

Chairperson: Jukka Marjanen, University of Helsinki, Finland

Professionalizing Pre-Service Teachers in the ´Third Space[a]: A University-School-Partnership

Design based research,Mixed-method research,Pre-service teacher education,Social aspects of learning,Communities of practice,Cooperative/collaborative learning

Urban Fraefel, University of Applied Sciences Northwestern Switzerland, Switzerland; Sebastian Junger, University of Applied Sciences and Arts Northwestern Switzerland (FHNW), Switzerland;

In the 21st century practice-based teacher education has increasingly focused on a growing range of dimensions of professional action. There is reason to doubt whether traditional approaches to field experience can respond to the needs of a comprehensive professionalization. Three areas which need more emphasis have been identified: (1) the integration of academic and practitioner knowledge, (2) an ability and willingness to cooperate in communities of practice, and (3) a focus on student learning. In a bid to confront these deficiencies, the University of Teacher Education Northwestern Switzerland has initiated and implemented a project which establishes university-school-partnerships to create hybrid spaces which allow pre-service and mentor teachers to cooperate in communities of practice and thus provide sustainable professionalization. The design-based research project uses quantitative and qualitative methods to analyze within the project timeframe and in comparison to a control group to what extent (1) the theory-practice gap can be bridged, (2) cooperation in school-based communities of practice can be promoted, and (3) the intervention affects a focus on student learning. First results indicate that the intervention has a significant effect on cooperation whereas the results regarding a focus on student learning and knowledge integration are not significant. Moreover, crucial factors for a successful implementation have been identified. Final results are expected by 2016.

Computer-based tests and Tablet-based tests: Whatís the difference?

Comparative studies,Assessment methods and tools,Technology,Primary education,Secondary education,Computer-assisted learning

Saskia Wools, Cito, Netherlands; Rianne Voesten, Cito, Netherlands;

In education, the use of tablet-computers increases. This is not limited to digital learning, it also concerns testing and assessments. In the literature regarding computer-based testing, a lot of emphasis is put on the differences between paper-based tests and computer-based tests. We argue that these difference can also occur when tablet-computers are used for assessment purposes.

However, little research is available regarding the differences between paper-based tests, computer-based tests and tablet-based tests. This empirical study aims to explore possible differences between computer-based tests and tablet-based tests. Central question that is answered is: what differences occur between computer-based tests and tablet-based tests? To answer this question data is collected within a small sample of students, but since this is a first exploration, the study is mostly qualitative in nature. In this study, students took a five-item-test on a tablet (touch-based) and a five-item-test on a laptop (with keyboard). Both tests consisted of the same item types but with other content. Students were also asked to indicate whether they liked a particular item type better in the tablet-based test or in the computer-based test. Analysis were performed on data collected through questionnaires, the item answers students provided in the two tests, response times for each item and observation reports provided by the test administrators. Results show differences between tablet-based tests and computer-based tests for all three distinguished categories of differences: presentation characteristics, response requirements and general administration characteristics.

Professional Teacher Communities: Effects on teacher learning and teaching strategies

Quantitative methods,School effectiveness,Teacher professional development,Communities of learners

Stelios Orphanos, Frederick University, Cyprus;

Professional learning communities are promoted as a promising strategy for teacher and schoolwide improvement. The main objective of this paper is to explore the links between conditions of (PLC), teacher learning and use of teaching strategies. This study represents the first effort to explore the links between PLC conditions, teacher learning and teaching practices in Cyprus. The studyís theoretical framework hypothesized that PLC conditions would positively influence the extent of teacher learning and subsequently the frequent use of effective teaching strategies while taking into consideration school leadership and teachersí professional efficacy. The sample consisted of 538 primary school teachers in Cyprus. The study utilized a teacher survey which provided measures on how the sample teachers perceived school leadership (emphasis on teaching and learning, vision and trust), PLC conditions (teacher collaboration, shared values, and collective learning), teacher efficacy, teachersí professional learning activities and teaching practices. The relationships between the latent constructs were analyzed through structural equation modeling (SEM). PLC conditions, supportive school leadership and teacher efficacy are all positively associated with teachersí professional learning but the impact of PLC conditions is the strongest among the three variables. Also, teachersí professional learning is positively associated with more frequent use of effective teaching strategies. The more teachers engage in professional learning the more they use effective teaching strategies. Results show that schools can improve their capacity for effective teaching and learning by establishing and nurturing PLC conditions.

The Studentsí Inventory: How Student Characteristics Bias Teacher Judgments

Experimental studies,Quantitative methods,Pre-service teacher education,Achievement

Johanna Kaiser, University of Kiel, Germany; Jens Moller, University of Kiel, Germany; Friederike Helm, University of Kiel, Germany; Mareike Kunter, Goethe-Universitat Frankfurt, Germany;

Teachersí judgments about studentsí academic achievement significantly affect studentsí academic careers. Research on teachersí judgment accuracy shows large interindividual differences between teachersí ability to assess their studentsí performance accurately. Many field studies have shown influences of student characteristics that should not be relevant for a judgment concerning a studentís achievement. Our aim was to further investigate the influences of student characteristics on teacher judgments of studentsí achievement. As in the real classroom the characteristics are often correlated with studentsí achievement, we chose an experimental design and systematically varied information about achievement and further student characteristics. The newly developed, so called studentsí inventory allows (graphically) presenting information about students and studying systematic biases in teacher judgments. Participants were N = 186 teacher candidates. The good news was that the displayed achievement in Mathematics had the highest influence on teacher candidatesí judgments. Apart from that we found an influence of studentsí intelligence and German achievement on the teacher candidatesí judgments of studentsí Mathematics achievement. No influence was found for studentsí socioeconomic status or academic self-concept. So, even in the experimental setting where no interaction with the student takes place it seems that a halo effect is working. Teacher candidates should be made aware of these systematic biases. Furthermore, they should get the opportunity to get feedback regarding their judgment accuracy. The studentsí inventory could be further developed to provide such feedback and serve as a training tool.

P 1

29 August 2015 13:45 - 15:15

Room Green_A4

Invited SIG

School effectiveness

Long-term school effects on educational transitions and outcomes in adolescence and adulthood

Keywords: Achievement,Attitudes and beliefs,Educational attainment,School effectiveness,Secondary education,Student learning

Sig's: SIG 18 - Educational Effectiveness

Chairperson: Katja Scharenberg, University of Bern, Switzerland

Organiser: Katja Scharenberg, University of Bern, Switzerland

Organiser: Wolfram Rollett, University of Education Freiburg , Germany

Discussant: Daniel Muijs, University of Southampton, United Kingdom

Reynolds & Teddlie (2000) called in their agenda for school effectiveness research for longitudinal studies analysing the effects of different educational contexts on transitions and outcomes. However, even to date, there is little research on long-term effects across different phases of schooling (Creemers, Kyriakides & Sammons, 2010). Thus, the aim of this SIG 18 invited symposium is to empirically investigate such long-term effects with a focus on educational transitions and trajectories, achievement and motivational outcomes ñ comprising the time span from primary over secondary to post-compulsory education and adulthood. The first paper draws on data from the SiBO-study in Belgium (Flanders). It focuses on long-term effects of primary schools on mathematics achievement and non-cognitive outcomes at the end of secondary school. In a mixed-methods approach, the second contribution analyses fostering and hindering conditions of successful transitions from primary to secondary school surveying students in England from age 3 to 16 (EPPSE 3-16). The third paper uses data of the Swiss panel survey TREE. It examines the effects of PISA reading literacy skills and tracking at the end of secondary school on the transition to post-compulsory education and educational attainment in young adulthood. Based on data of the LifE-study in Germany, the fourth contribution analyses long-term effects of academic performance, school achievement willingness and school climate in adolescence on job achievement willingness in adulthood 30 years later. Our discussant Daniel Muijs highlights common issues and methodological approaches of these papers and demonstrates the implications of the findings for educational research and practice.

Long-term effects of primary education

Quantitative methods,School effectiveness,Achievement,Educational attainment,Primary education,Secondary education

Griet Vanwynsberghe, KU Leuven, Belgium; Jan Van Damme, KU Leuven, Belgium; Sarah Gielen, KU Leuven, Belgium;

Previous educational effectiveness research has demonstrated that some schools are more effective than others. Unfortunately, little research has addressed school effectiveness in the long run. In this paper, we examine long-term effects of schools for primary education in three ways: First of all, by looking at the attained educational position of students at the end of secondary education; secondly, by examining the average mathematics achievement at the end of secondary education; and thirdly, by examining the non-cognitive outcomes at the end of secondary education. The study uses data of the longitudinal SiBO-project (Dutch acronym for School Trajectories in Primary Education). A cohort of 6,000 Flemish pupils from 200 schools were intensively followed from Kindergarten (age 5-6) until grade 7 (age 12-13). Afterwards, factual information about the educational position was yearly obtained. In 2014, at the age of 17, 65% of the cohort participated in a mathematics test and a student questionnaire. We aim at answering these questions in the first phase by exploring the school trajectories of all 6,000 students in secondary education. In the second phase, multilevel models and, if possible, cross-classified multilevel models in the transition from primary to secondary education will be used. We

distinguish also between effects of primary schools with and without considering the mathematics achievement level at the end of primary school, and analogous for the non-cognitive outcomes.

What makes a successful transition from primary to secondary school in England?

Quantitative methods,School effectiveness,Student learning,Social aspects of learning,Primary education,Secondary education

Maria Evangelou, University of Oxford, United Kingdom; Pamela Sammons, University of Oxford, United Kingdom; Brenda Taggart, University College London, United Kingdom; Kathy Sylva, University of Oxford, United Kingdom; Edward Melhuish, University of Oxford, United Kingdom; Iram Siraj, University College London, United Kingdom;

The Effective Pre-school Primary and Secondary Education (EPPSE 3-16) project is a major longitudinal study investigating the influence of pre-school, primary and secondary schooling on childrenís cognitive and social/behavioural development in England. This sub-study used a sample of more than 500 children and families. The study examined the experiences and perceptions of both pupils and parents during the transition process and described the specific practices associated with positive and negative transitions (as reported by pupils and parents). The influence of child and family background characteristics such as socio-economic status (SES) and gender on the transition experience were also examined. By adopting a mixed methods approach combining qualitative and quantitative data, the study investigated the issues related to transition for four distinctive groups: Local Authorities (LAs), children, parents and schools. Officers in six LAs were asked about the way transition was dealt within their Authority. Children in their first term at secondary school completed a questionnaire on their attitudes to and experiences of transition, and the study also sought their parentsí opinions in order to illustrate the whole familyís experience. The study identified a range of practices employed by schools. These included the use of ëbridging materialsí, the sharing of information between schools, visits to schools by prospective teachers, children and their parents, distribution of booklets about school rules, talks at the schools, ëtasterí days, and other joint social events between schools. Most of the children in the study had a positive transition experience, but a noticeable minority did not.

Effects of PISA reading literacy and tracking on upper secondary entry and educational attainment

Quantitative methods,School effectiveness,Educational attainment,Higher education,Secondary education,Lifelong learning

Katja Scharenberg, University of Bern, Switzerland; Melania Rudin, Buero fuer arbeits- und sozialpolitische Studien (BASS), Switzerland; Barbara Mueller, University of Bern, Switzerland; Thomas Meyer, University of Bern, Switzerland; Sandra Hupka-Brunner, University of Bern, Switzerland;

At the end of compulsory school, students should be ìskilled for lifeî (OECD, 2013) with basic competencies allowing a successful transition into adult life. Thus, policy makers are also interested in knowing how these competencies such as reading literacy will affect studentsí life trajectories, their educational attainment in (early) adulthood and their transition into the labour market (OECD, 2012). Our research focuses on these questions: What is the impact of PISA reading literacy and attended track in secondary school ñ both indicators of school achievement ñ on young adultsí post-compulsory educational pathways? Do school-related indicators of achievement show stronger long-term effects on educational attainment in young adulthood than indicators of studentsí socio-cultural origin? Data base for the analyses is the Swiss youth panel survey ìTransitions from Education to Employmentî (TREE, Bergman et al., 2011). The base sample comprises 6,343 students who participated in the PISA 2000 survey and is representative of a cohort of approximately 80,000 school leavers. This sample has been followed up in seven annual survey panels between 2001 and 2007 and two further panel waves in 2010 and 2014. The results (Scharenberg et al., 2015) of the multinomial logistic regression analyses emphasise that ñ over and above the effects of studentsí socio-cultural origin ñ PISA reading literacy skills at the age of 15, grades and the attended track at lower secondary school do not only influence studentsí likelihood of entering upper secondary education. They also show significant long-term effects on studentsí educational attainment even ten years after completing compulsory education.

Development of willingness to achieve in adulthood depending on school climate in adolescence

Quantitative methods,Student learning,Emotion and cognition,Social interaction,Secondary education,Learning in context

Katharina Maag Merki, University of Zurich, Switzerland;

Achievement willingness (AW) is defined as a relatively stable competence to be persistent, ambitious and hardworking. Previous research has shown that AW is related to the perceived school climate (SC). However, there is a lack of studies which analyse the interrelationship of SC, AW and student achievement longitudinally from adolescence to adulthood. The following study analyses three questions: 1. If and how do level and change of AW in secondary schools predict the level of AW in adulthood? 2. If and how are AW, SC and academic performance related to each other in secondary schools? 3. If and how do level and change of SC predict the level of AW in adulthood, and is there a moderator effect in terms of academic performance level in adolescence? Data was taken from the LifE-study in Germany (1979-1983 (age of 12-16), 2002 (age 35), 2012 (age 45)). The research questions were analysed by latent growth curve modelling and by multi-group comparison between high and low performers. The results confirmed the close relationship between achievement willingness, school climate and academic performing during adolescence and in the long-term. Particularly, the change of SC during adolescence is important for the development of AW in adolescence and also for the level of AW 30 years later. However, the latter is only true for low performing students. Accordingly, continuity of a positive school climate acts as a protection factor that has the potential to compensate for achievement deficits.

P 2

29 August 2015 13:45 - 15:15

Room Brown_B6

Invited SIG

Higher education

Preparing students for professional practice within higher education

Keywords: Competencies,Higher education,Learning in context,Teaching/instruction

Sig's: SIG 4 - Higher Education

Chairperson: Eva Kyndt, University of Leuven, Belgium

Organiser: Eva Kyndt, University of Leuven, Belgium

Organiser: Liisa Postareff, University of Helsinki, Finland

Discussant: Mien Segers, Maastricht University, Netherlands

Students face substantial challenges in crafting their professional future. When entering the labour market, they are often confronted with structural barriers in finding a (high-quality) job, as evidenced in increasing levels of youth unemployment and underemployment. This symposium focuses on practices within higher education as well as the students' competences that support students' transitions to the labour market. The symposium will start with a short presentation of the state of the art of the research on the transition from education to work by Grosemans and Kyndt. This presentation will be based on systematic search of the literature on this topic. The first empirical paper by Damsa and Nerland investigates whether project-based learning settings prepare student to be competent and reflective knowledge workers by actively taking part in constructing knowledge and in enacting knowledge practices characteristic for their future professional practice. The second empirical paper of Aili and Nilsson focuses on different work placement visions and practices across 28 different educational programs. In general, it has been shown that work placement programs contribute to students' employability. The paper by Tuononen et al. assesses students' perceptions of their academic competences at the end of higher education. In addition, they investigate which factors are related to perceptions of successful transition from university to working life.

Introducing students to web design and development through collaborative projects

Case studies,Competencies,Engineering,Higher education

Crina Damsa, University of Oslo, Norway; Monika Nerland, University of Oslo, Norway;

This study examines the participation of undergraduate students enrolled in a computer engineering program in activities that involve the collaborative design and development of webpages, in project-based learning settings. Research highlights the need for profession-oriented educational programs to prepare students for active participation in advanced knowledge work, and the specific processes through which such knowledge is produced and shared in their prospective domain. Our study aims at gaining a better understanding of students? participation in collaborative project work, together with the emergent understanding and enactment of knowledge practices characteristic to their prospective profession. A rich set of data enabled a detailed examination of the way four student groups used knowledge resources and co-developed their web pages through collaborative work throughout a four-week project period. The findings show that studentsí work was characterized by joint programming, and systematic use of professional procedures and online resources. The study emphasizes the necessity for students to understand the mechanisms and knowledge underlying the web development practice, besides knowing how to apply these and to critically analyze knowledge resources available; and, for the institutions, to provide the appropriate guiding structures for this type of engagement with the knowledge and practices of the domain.

Standardization meets practice ñ The case of integrating research-based work placement

Case studies,Ethnography,Interdisciplinary,Higher education

Carola Aili, Lund University, Sweden; Lars-Erik Nilsson, Kristianstad University, Sweden;

A local reform, with the vision to educate Swedenís most employable students was adopted by the board at a Swedish university. An important means for reaching the vision was a work placement. Students in all 28 programs at the university should be guaranteed at least five weeks supervised research based practice and learning in companies and organizations. Following the decision, activities were initiated in all Higher education programs to implement the placement reform. To document strategy work, yearly interviews were conducted with the head of the programs, course heads and teachers. Syllabi were collected and changes kept track of. Program dialogues were followed using ethnographic field work methods. University and program strategizing is explored from three questions: 1/ how did staff make sense of and turn strategy into practice? 2) what resources became important to strategy work? and 3) what kind of placement, what kind of examinations, what kind of supervision etcetera were the result. A strategy as practice-perspective is used to explore what became of the standardized model for placement envisioned in the university boards strategy. The result show that standardized placement was not possible for the programs. Instead different understandings of the reform based on the programs different conditions, led to a variation in what kind of placement they introduced.

University studentsí perceptions of their academic competencies at the time of their graduation

Content analysis,Qualitative methods,Student learning,Competencies,Higher education

Tarja Tuononen, University of Helsinki, Finland; Lari Lemmetyinen, University of Helsinki, Finland; Anna Parpala, University of Helsinki, Finland; Sari Lindblom-Ylanne, University of Helsinki, Finland;

Universities are facing the challenge when preparing students for the working life. Graduates are expected to have diverse academic competencies, learn to use knowledge comprehensively and get a job after graduation. The aim of this study is to explore Masterís studentsí perceptions of their academic competencies. In more detail, the aim is to explore what kind of factors are related to perceptions of successful transition from university to working life and what kind of difficulties students might have regarding the transition phase. The data of the study consisted of 67 Masterís studentsí semi-structured interviews which were collected at the time of graduation and transition to working life. The interviews were analysed using content analysis. The five profiles emerged from the data: 1) Academically oriented students, 2) Students with clear future goals, 3) Self-developers, 4) Practically oriented students, and 5) Students lacking their future goals. First three profiles represent students who had experienced successful transition process from university to working life, and the last two profiles consisted of students who had difficulties in transition. This study revealed that studentsí positive perceptions of their academic competencies and successful transition were related to experiences of having good generic skills, high self-efficacy beliefs for the future working life and ability to see usefulness of work experience. Recognising the factors that are related to studentsí successful transition, universities are able to develop practices that support studentsí transition to working life.

Transition from higher education to work: State of the art

Student learning,Competencies,Higher education,Lifelong learning

Eva Kyndt, University of Leuven, Belgium; Ilke Grosemans, KU Leuven - University of Leuven, Belgium;

It has been well established that the level of initial education of graduates is an important predictor for graduatesí success on the labour market. Prior research has shown that higher education graduates have a higher likelihood of getting and maintaining a job. From a learning perspective, research has consistently shown that this group of graduates engages considerably more in work-related learning in comparison with their lower qualified peers. However, it seems that research on the factors within education that promote a smooth transition from higher education to work is scarce. In other words, we know that students benefit from higher education, but it remains unclear why. In the first part of the symposium, a short introduction will be provided on the current state of the art of the research investigating factors within higher education that foster a smooth transition. This presentation about the state of the art is based on a wide systematic search of the literature, starting with over 20.000 unique search results (including all levels and types of education). For this introduction, key references about factors within higher education that promote the transition and future development will be discussed in order to present the audience with a current state of the art of the topic.

29 August 2015 13:45 - 15:15

Room Brown_B3

Symposium

Social interaction in L&I

Educational neuroscience and learning interactions

Keywords: Cognitive skills,Cooperative/collaborative learning,Distributed cognition,Emotion and cognition,Interdisciplinary,Neuroscience

Sig's: SIG 22 - Neuroscience and Education

Chairperson: Patrice Potvin, Universite du Quebec a Montreal, Canada

Organiser: Julien Mercier, University of Quebec in Montreal, Canada

Discussant: Julien Mercier, University of Quebec in Montreal, Canada

Throughout the world, every day, in every classroom, students are interacting with their teachers and peers. While recent educational reforms promote student-teacher and peer interactions on the basis of cognitive and affective considerations, current research on learning interactions, based on behavioral observations, is severely limited by incomplete records of protagonists' cognitive processes and affective states on which learning is contingent. Considering the formulation of pertinent theories during the last 25 years and recent technical developments, the conditions for contributions from educational neuroscience to this line of research are now met. One strategy involves extending previous work on individuals to the study of dyads. Participants in this symposium are invited to present an empirical study or theoretical work in educational neuroscience which could contribute theoretical or methodological advances to an emerging research program oriented towards the concomitant behavioral and psychophysiological modeling of cognitive and affective aspects of learning interactions. Potential outcomes include the optimization of learning interactions - whether in the classroom or distance learning - by the mapping of characteristics of the interaction with their non-behavioral fine-grained impact on learning (that is, information on affective and cognitive processing by the student(s) and teacher that does not disrupt the natural interaction). Conversely, this research could foster the applied impact of existing research in educational neuroscience, by contributing ecologically-valid results with respect to contemporary contexts that involve interaction between individuals.

How task demand impacts the neural efficiency of working memory tasks

Neuroscience,Student learning,Cognitive development,Intelligence

Daniela Nussbaumer, ETH Zurich, Switzerland; Roland Grabner, University of Graz, Austria; Elsbeth Stern, ETH Zurich - Research on Learning and Instruction, Switzerland;

Studies of human intelligence provide strong evidence for the neural efficiency hypothesis, which suggests more efficient brain functioning (i.e., less or more focused activation) in more intelligent individuals. Recent studies have specified the scope of the neural efficiency hypothesis by suggesting that the relationship between brain activation and intelligence only holds true for problems of moderate difficulty and can be altered through training. We investigated the moderating roles of task difficulty and training on the neural efficiency phenomenon in the context of working memory training. In 54 participants, cortical activation was assessed by means of electroencephalography (EEG), or more precisely by means of event-related desynchronization (ERD) in the upper alpha band. ERD was assessed during performance of working memory tasks in a pre-test ñ training ñ post-test design, comparing groups of lower and higher intelligence. We found supportive evidence for the neural efficiency hypothesis only in moderately difficult working memory tasks, even in the absence of performance differences. There was no effect of intelligence on the simple demanding, adaptive working memory tasks. In the latter task, however, an intelligence-related difference emerged at the behavioral level. Training did not modulate the relationship between intelligence and brain activation. These results corroborate the moderating role of task difficulty in the neural efficiency hypothesis in the context of working memory demands and suggest that training does not impact the neural efficiency phenomenon in the context of working memory demands.

Brain activity during learning from pictures: An event-related potentials experiment

Neuroscience,Student learning,Cognitive skills,Technology

Angeliki Tsiara, University of Ioannina, Greece; Giwrgos Stergios, University of Ioannina, Greece; Tassos Mikropoulos, University of Ioannina, Greece;

Cognitive processes are predominant in learning mechanisms. The systematic investigation of cognitive processes under educational contexts drives educational research, instructional design, learning technologies, and teaching interventions. The study of cognitive processes occurring during scientific thinking contributes to a better understanding of the environmental stimuli used in science education and can be detected through neuroimaging techniques. The purpose of this study was to explore possible differences in electric brain activity of young male adults while observing pictures of different content in a digital learning environment for earthquake precaution measures. An event-related potentials study was conducted in order to investigate visual awareness and mental effort. First results showed that P300 brain signals can be used to discriminate between pictures showing useful and non-useful items one has to bring with them in their earthquake survival kit.

Cognitive control in the study of individuals and dyads

Neuroscience,Student learning,Cognitive development,Cognitive skills

Sandrine Rossi, Universite de Caen, France; Lorie-Marlene Brault Foisy, Universite du Quebec a Montreal (UQAM), Canada;

Our starting point is provided by our previous studies on the role of cognitive control in access to rational thinking. In the context of school learning, intuitive thinking must be sometimes override by slow and effortful controlled processes in order to perform learning tasks. We want to extend our work by questioning the effect of learning in cognitive control on the causal dynamics of neurocognitive networks. Furthermore, cognitive control can be even more important in the context of a learning task to be performed with a peer, since an additional level of coordination between learners within interpersonal interaction is necessary.

Assessing engagement in learning interactions: A neuroscientific perspective

Neuroscience,Student learning,Emotion and cognition,Social interaction

Patrick Charland, Universite du Quebec a Montreal, Canada; Pierre-Majorique Leger, HEC-Montreal, Canada; Yannick Skelling, Universite du Quebec a Montreal, Canada;

As a contribution to the emergence of a learning interactions research relying on educational neuroscience data, this talk aims to discuss the potential transferability of methods and algorithms developed in the field of neuroergonomics. The author recently developed a methodology that assesses the multiple dimensions of learner engagement (behavioral, cognitive, and emotive) in synchrony. A case study was lead to evaluate the validity of the metrics. Ten right-handed male university students were asked to solve ten physics problems on a computer. Each problem was preceded by a pause, where participants had to relax, eyes-closed, and was followed by a self-declared questionnaire on their engagement, interest and level of control during problem solving. During pauses, problems and self-declared questionnaires, multidimensional engagement data was collected with multiple psychophysiological instruments: i) cognitive engagement: electroencephalography (EEG), ii) emotional engagement (valence and arousal) : electrodermal activity (EDA) sensor and automatic recognition software of facial emotions, and iii) behavioral engagement : task performance and eye-tracking. Globally, findings provide arguments in favor of the transferability of neuroergonomic methods to the educational research field. An analysis of variance (ANOVA), coupled with a post-hoc analysis, shows that cognitive engagement is significantly higher during problem solving and questionnaire filling than during the pauses. Interestingly, no significant differences are observed in emotional engagement for the three conditions. The paper finally argues that continuous psychophysiological data collection, like engagement, can eventually contribute to objectively assess learning interactions of dyads.

P 4

29 August 2015 13:45 - 15:15

Room Brown_B1

Symposium

Assessment methods and tools

Screening Measures and Procedures in Schools

Keywords: Achievement,Assessment methods and tools,At-risk students,Cognitive skills,Emotion and affect,Psychometrics

Sig's: SIG 18 - Educational Effectiveness

Chairperson: Bridget Dever, Lehigh University, United States

Organiser: Bridget Dever, Lehigh University, United States

Discussant: Randy Kamphaus, University of Oregon, United States

In order to identify students who may need additional support or intervention in school, early assessment in the domain of interest is critical. Additionally, the desire to identify all students in need of a given intervention often requires that all students in a school be assessed for potential risk for difficulties, so that candidates for intervention are not overlooked. Increasing demands on the time of schools and teachers, however, necessitate the development of assessments that are efficient and user-friendly. Universal screening offers the opportunity to quickly assess all students in a school for difficulties in a chosen focal area. This symposium presents four papers focused on screening assessments in diverse domains related to educational effectiveness: 1) executive functioning, 2) memory, 3) academic skills, and 4) behavioral and emotional difficulties. The aims of this symposium include introducing instruments available for screening in each domain, examining the psychometric properties of these instruments, and discussing practical considerations when conducting a school-based screening program.

Development of Teacher/Parent Everyday Memory Questionnaire of Clinical Evaluation of Memory

Psychometrics,Assessment methods and tools,At-risk students,Cognitive skills

Elena Perez-Hernandez, Universidad Autonoma de Barcelona , Spain; Randy Kamphaus, University of Oregon, United States; Fernando Sanchez-Sanchez, TEA Publisher, Spain;

The ability to learn, and to remember experiences and information, is essential to the cognitive, social and emotional development of children. The Evaluacion Clinica de la Memoria (Clinical Evaluation of Memory, ECM, Kamphaus, Perez-Hernandez and Sanchez-Sanchez, in press) is a multicomponent and multidimensional memory test. The ECM was developed to assess the everyday memory and the objective memory performance of individuals from 6 to 80 years old. In this presentation we will focus on the psychometric properties and possibilities of the ECM Teacher and ECM Parent Everyday Memory Questionnaire (Ages 8 to 17). One hundred fifteen healthy students from 8 to 17 years old participated. Internal consistency of the questionnaires was high. Teacher questionnaires yielded reliable correlations between the questionnaire total score and all the academic subjects assessed. On the other hand, the ECM Parent Everyday Memory Questionnaire total score was poorly correlated with Spanish language and foreign

language. Thus, the ECM Teacher Everyday Memory Questionnaire has better potential to serve as a memory screening assessment.

Measuring studentsí executive behavior: Empirical and psychometric support for a new screening tool

Psychometrics,Assessment methods and tools,Achievement,At-risk students,Cognitive skills

Mauricio Garcia-Barrera, University of Victoria, Canada;

The problem of valid measurement of psychological constructs has been an impediment to scientific progress, and this is particularly the case in the assessment of executive behavior in students. This multidimensional ability has been controversial since its first descriptions and multiple models have been developed in an attempt to consolidate our understanding of the contributions of emotional and cognitive control components to self-regulation. The ecological assessment of executive functioning has been improved with the introduction of rating scales. The purpose of the series of studies included in this paper presentation was to examine the construct, clinical, and convergent validity of a screening tool for the estimation of executive functions in school-age children (6-11 years old) and in university students (18-25 years old). For this purpose, a measurement model with 23-25 items loading into four latent factors representing executive functions (behavioral control, emotional control, attentional control, and problem solving) was developed, and its statistical properties were examined using multiple replications in a range of large samples from different nations, ages, and clinical statuses. Our results provide accumulative empirical evidence to support the theoretical model of executive functioning we developed, and furthermore, our findings demonstrate the robust psychometric characteristics of the executive functioning screener we derived. Once implemented, this screener will provide clinicians and educational researchers with a reliable and valid tool for a quick first estimation of the status of executive behavior in students from schools and university settings.

Teacher Judgment in Screening for Academic Skills Problems

Psychometrics,Assessment methods and tools,Achievement,At-risk students

Edward Shapiro, Lehigh University, United States; Katie Flatley, Lehigh Univerity, United States;

Universal screening of students for academic skills problems has become a common place process in most elementary schools within the United States. Typically the screening process involves empirical data-based data collection of student performance on measures designed to assess broad sets of skills across multiple domains. Although data-based screening processes such as those described above are valuable in determining empirical cut points for providing remediation services for children, all of these methods require extensive time commitments that can reduce instructional time. Research has found that teacher judgment may be a highly under-utilized, yet highly accurate process for assessing the academic skills of students. The aim of this paper is to present research on the potential use of the Rating Scales for Academic Skills (RSAS)

as a screening measure for the assessment of reading comprehension and mathematics. The paper will first briefly describe the development and validation of the RSAS, and then in more detail, its use as part of a two-stage screening tool for assessing reading comprehension and mathematics in grades 3 to 5 (ages 8 to 10) students.

Universal Screening for Behavioral and Emotional Risk in Schools

Psychometrics,Quantitative methods,Assessment methods and tools,At-risk students,Emotion and affect,Secondary education

Bridget Dever, Lehigh University, United States; Tara Raines, University of Nevada, Las Vegas, United States;

In the United States, a significant number of youth are negatively affected by emotional and behavioral and problems each year. According to the American Psychiatric Association (1994), approximately 20% of youth experience symptoms of diagnosable emotional and behavioral disorders, and 5% of youth experience symptoms severe enough to impair major life functioning (U.S. Department of Human and Health Services, 1999). Despite the potential to intervene and prevent deleterious outcomes, only 15 to 20% of those youth with emotional and behavioral disorders actually receive any type of intervention services (Ringel & Sturm, 2001; United States Public Health Service, 2000). School-based, universal screening has emerged as an efficient way to assess a diverse student body and identify students who are at-risk for or currently experiencing emotional and behavioral difficulties; however, only 2% of schools actually employ universal screening techniques (Romer & McIntosh, 2005). The proposed presentation will review the results of a screening program for behavioral and emotional risk that was conducted at the district level, which involved universally screening all high school students in the district. Results of this screening effort will be presented, including meaningful trends in behavioral and emotional risk by gender and grade level. This paper will also overview several practical components that may influence the successful implementation of school-based, universal screening, such as obtaining administration buy-in, scheduling, staffing, and organizational factors.

P 5

29 August 2015 13:45 - 15:15

Room Orange_E1

Symposium

Motivation

Heterogeneity of Learning Motivation

Keywords: Emotion and cognition,Mixed-method research,Motivation and emotion,Quantitative methods,Self-regulation

Sig's: SIG 8 - Motivation and Emotion

Chairperson: Thomas Martens, Medical School Hamburg, Germany

Organiser: Thomas Martens, Medical School Hamburg, Germany

Discussant: Andreas Gegenfurtner, Maastricht University, Netherlands

14.00 This symposium pursues a person-centered approach that values different ways of personal learning motivation. For this purpose, all papers try to integrate different theoretical approaches. Especially, goal theory is broadened with components of self-regulated learning (papers 1,2,4) and other motivational concepts. Different methods were applied to analyze and understand individual forms of motivation: e.g. quantitative methods that are able to differentiate distinct subpopulations (papers 1 and 3), longitudinal data (papers 1 and 2) and mixed methods that combine quantitative and qualitative data (paper 3). One major hypothesis of all four papers is that different ways of personal motivational regulation might lead to the same learning outcome. Nevertheless, these achievements might be accompanied by very different emotions connected to the motivation type (papers 2 and 4). Furthermore, all four papers reflect that motivational regulation is a result of situational influences as well as personal dispositions. In a relatively "new" learning situation, motivational regulation is somehow "unbalanced" (paper 3) or "unsettled" (paper 2). With a sustained challenging situation or growing learner experience the regulation pattern might get more balanced (paper 3) and more homogenous (paper 1). The joint perspective of all four papers will tackle scientific and practical challenges: How will motivational regulation change over the life span? Which are crucial experiences to change motivational regulation? How can teaching and instruction consider different motivational profiles and develop an individual-centered perspective on motivation?

Multiple groups, multiple reasons for studying and multiple outcomes

Quantitative methods,Achievement,Higher education,Motivation and emotion

Luke K. Fryer, University of Sydney, Japan;

Background Students pursue a wide range of goals in any given context and while engaged in most tasks. Current motivational theory has consistently supported the idea that it is the quality of studentsí goals, rather than their quantity, that is critical. In addition to studentsí goals other motivations and beliefs (ability, value and effort) can play a substantial role in goal pursuit and should be accounted for when modeling studentsí longitudinal development. Aims Examine the heterogeneity and longitudinal development of student motivational profiles over the course of an academic year. Methods First-year students (n=920) from one private university in Western Japan, studying in seven different departments. Students completed surveys after one month and in the final month of their first academic year about studying in their individual departments. A latent profile analysis of the resulting data was undertaken. Results and Discussion Three and two groups were identified at Time-1 and Time-2 respectively. At both time points the quality of studentsí goals was an important difference between the groups observed. Across the profiles, students with fewer motivational deficits and stronger goals achieved at a higher level.

Conclusions In the current research context, the heterogeneity of studentsí motivational profiles declined. Consistent with past research, the relative quality (in addition to the quantity) of studentsí goals played an important role in differentiating between the high and low achieving groups. Our findings also suggest that only students with relatively high motivation experience meaningful differentiation in their goal regulation and might thereby achieve higher outcomes.

Patterns of motivational regulation in early adolescence

Achievement,Goal orientation,Self-regulation,Motivation and emotion

Marjaana Veermans, University of Turku, Finland; Hanna Jarvenoja, University of Oulu, Finland; Sanna Jarvela, University of Oulu, Finland;

Earlier research indicates that there is unpredictability between pre-existing goal orientations and motivational regulation strategies. It has also been argued that motivational regulation is more needed in academically challenging secondary or higher education, and the most refined forms may not develop until youth. The aims of the current study were to examine 1) what motivational regulation strategies young adolescents use over the years, and how they are related to achievement; 2) how studentsí motivational regulation strategies change over the years with respect to different levels of intrinsic goal orientation? 39 students participated in the study in three yearsí time. At the beginning of the study, the students were 9-12 years old. The students completed two questionnaires three times. In addition, the students drew a concept map before and after the each project. The results showed that young adolescents preferred same strategies as older students found in earlier studies. Similar strategies were preferred across the years, only frequency descended. These results are supporting an assumption that it is not likely that there exists direct effect between motivational regulation strategies and actual performance. This suggests that use of motivational strategies is related to succeeding in the school, and getting good grades, rather than learning as such. The fact that there were almost no differences between high and low intrinsic goal orientation group indicates that problems adolescents are facing during completing academic task have stronger influence on use of motivational regulations strategies than their initial motivational beliefs.

Different Pathways of Learning at University: Exploring the Heterogeneity of Motivational Processes

Mixed-method research,Student learning,Self-regulation,Higher education,Motivation and emotion

Thomas Martens, Medical School Hamburg, Germany;

This study aims to identify typical pattern of learning motivation at university. As theoretical background the Rubicon model of action phases (Heckhausen, 1989) was extended by a previous motivation phase that initiates an assessment of the future learning situation. The resulting Integrated Model of Learning and Action defines three main phases of learning: The motivation phase refers the need to reduce a perceived learning deficit or to tackle a learning challenge. In the intention phase, an intention for learning actions is formed which can fulfil the learning

motivation. In the volition phase, finally, a learning intention is translated into a real learning action. Using a mixed-methods sequential explanatory design 523 students of Educational Science and 516 students of computer science were initially asked with an online questionnaire. Of these, 12 selected students were interviewed. Questionnaire Scales: Perceived Threat, Sensitive Coping, Acceptance of Responsibility, Outcome Expectancy, Self-Efficacy, Persistent Goal Pursuit: Maintenance, Persistent Goal Pursuit: Distraction, Goal Congruent Self-Monitoring, Working with Peers, Generation of Positive Emotions, Effort Avoidance after Negative Emotions, Metacognitive Learning Strategies. In a 2-step-analysis process based on IRT methods 4 subpopulations could be identified for each sample. These results confirm preliminary studies. In addition, population-specific pattern can be identified: an ìextrinsicî learning motivation (computer science) and an ìunsecureî and an ìunsettledî learning motivation (education). The interviews imply that the pattern of motivational regulation are often associated with prior experiences and are usually not modified for a long time, especially if associated with negative emotions.

First year teacher education studentsí motivational orientation and strategic learning skills

Pre-service teacher education,Goal orientation,Self-regulation,Motivation and emotion

Piia Naykki, University of Oulu, Finland; Arto K. Ahonen, University of jyvaskyla, Finland; Erkko Sointu, University of Eastern Finland, Finland; Jaana Isohatala, University of Oulu, Finland;

The aim of this study is to examine novice teacher education studentsí motivational orientation and strategic learning skills. First year teacher education students (N = 320) from three Finnish universities participated to this study. Studentsí cognitive-motivational profiles were identified based on their questionnaire responses, and profiles were used to further explore if there are differences in terms of studentsí lack of wellbeing (feelings of exhaustion and anxiety). The study is a part of a longitudinal project that explores and promotes teacher education studentsí learning skills. The results of this study will be used in designing intervention studies to develop learning and teaching practices to support studentsí motivation for learning and strategic learning skills. Follow-up studies (repeated measurements during four year period) will show if studentsí motivational orientations and strategic learning skills will change and develop during their studies. Furthermore, if the novice studentsí cognitive-motivational profile in the first year of their teacher education studies will predict future learning orientation and success as a teacher education student.

P 6

29 August 2015 13:45 - 15:15

Room Green_A3

Symposium

Assessment methods and tools

From teachersí assessment practices to shared professional judgment cultures

Keywords: Assessment methods and tools,Communities of practice,Student learning,Teacher professional development

Sig's: SIG 1 - Assessment and Evaluation

Chairperson: Cristina Carulla, IRDP, Switzerland

Organiser: Lucie Mottier Lopez, University of Geneva, Switzerland

Organiser: Cristina Carulla, IRDP, Switzerland

Discussant: Linda Allal, University of Geneva, Switzerland

The notion of "judgment" is closely tied to teachers' assessment practices of students' learning. For instance, the judgment can be associated to the teacher's assessment activity of interpreting the information gathered about students' understanding. It can also be used as a more general framework, when it is conceptualized in terms of "professional judgment" associated with ethical norms and individual and collective reflexive thinking of the teachers. This symposium analyses assessment judgment in both (1) individual level, during formative assessment and during grading processes; (2) and collective level, in particular during "social moderation practices" where teachers think together about student work and reach consensus about the quality of that work. A major issue is to think the quality of teachers' assessments, according to criteria which takes into account the specific nature of classroom-based assessment practices. The papers presented in this symposium examine this issue from a theoretical perspective looking at researchers' discourses and with respect to empirical findings. The symposium aims to improve understanding of learning assessment as daily carried out in classrooms (in the students' presence or not), and the relation with "schools' assessment culture" including institutional constraints and possible aspects which are co-constructed between teachers and other partners (researchers, trainers, principals, etc.). The framework of "professional judgment" is used in order to think the relation between individual and collective levels of students' learning assessment. Implications in terms of teachers' continuing professional development are discussed.

Teachersí judgments on-the-fly: Teachersí response patterns to studentsí responses in IFA

Video analysis,Assessment methods and tools,Learning approaches,Mathematics,Science education,Learning in context

Maria Araceli Ruiz-Primo, University of Colorado Denver, United States; Deanna Sands Sands, Seattle University, United States;

Formative assessment has been characterized using four formative assessment activities: Clarifying learning goals and expectations, gathering information about studentsí understanding, analyzing and interpreting information, and acting upon the information gathered to move studentsí learning forward. Analyzing and interpreting the information gathered involves

teachers judging studentsí responses. During informal formative assessment these judgments happen on-the-fly; that is, teachersí need to judge the quality of studentsí responses and make decisions almost instantly based on what studentsí respond to any given question or task. When teachers judge on-the-fly it is difficult to determine the analysis and interpretation that was done to the studentsí response. However, the judgment can be inferred based on the teachersí actions in reaction to the studentsí responses. In this paper we explore the type of teachersí actions that result from judgments done on-the-fly. The results presented in the paper are guided by the following research questions: What type of teachersí actions, oral feedback or instructional movement, are most likely to be observed in response to on-the-fly judgments? What type of judgment is most likely to be observed during informal formative assessment, based on individual interactions or based on whole class interactions? Is there a difference in the type of teachersí actions observed in more and less expert teachers? The paper will present information based on the analysis of 1257 videos collected in 19 classrooms during the implementation of one instructional unit per teacher, either mathematics or science.

Situated judgment in summative assessment practices about mathematics and writing in primary school

Qualitative methods,Assessment methods and tools,Language (L1/Standard Language),Mathematics,Primary education,Learning in context

Lucie Mottier Lopez, University of Geneva, Switzerland; Walther Tessaro, University of Geneva, Switzerland; Lionel Dechamboux, Universite de Geneve, Switzerland; Fernando Morales Villabona, University of Geneva, Switzerland; Sophie Serry, University of Geneva, France;

Few studies have examined ìjudgment in practiceî, when the teacher is grading student work in a professional context. In a situated perspective, we use the theoretical proposition of Lave (1988) about ìcognition in practiceî in order to study the teacherís assessment judgment as both a cognitive process and a social practice (Mottier Lopez & Allal, 2008), and in relation to a socially-organized culture of assessment emerging during social moderation practices (Wyatt-Smith, Klenowski, & Gunn, 2010). Based in the French-speaking part of Switzerland, our research examines individual teachersí judgment in summative assessments which concern 8 to 9-year-old students, in mathematics (when solving additive problems) and in French (when writing texts). What are the interpretations and reasoning that the teachers mobilize during the grading process? What kind of hesitations and difficulties do they have? What evolving arrangements do they consequently decide ìin practiceî? Our research will put into perspective these results with collective meanings co-constructed during social moderations between teachers and researchers, drawn from a previous study (Mottier Lopez, Tessaro, Dechamboux & Morales Villabona, 2012). We will show the tensions between individual and collective levels of assessment practices and discuss them within a ìprofessional judgmentî framework.

Changing assumptions to support judgments about successful learning: A critical study of assessment

Qualitative methods,Assessment methods and tools,Learning approaches,Social interaction,Science education,Learning in context

Cristina Carulla, IRDP, Switzerland; Paola Valero Valero, Aalborg University, Denmark;

There is a political move expecting that teacher educators, and teachers in different educational systems will adapt pedagogical principles produced in assessment for learning and Inquiry Based Science Education (IBSE) research fields. It was observed a need to research the role played by learning theories in the constitution of assessment for learning research and to research critically the role played by the every day life of individuals in assessment for learning (Carulla, 2013). The aim of this communication is to point the shortcomings of the individualistic view of assessment in the case of an international network of IBSE, and try to re-signify assessment for learning in IBSE by drawing on socio-cultural theories of learning. For that purpose, assessment for learning within IBSE research (e.g. Harlen, 2006) was identified as a cultural-historical activity (Roth and Radford, 2011). From the analysis of texts coming from network documents, dialogues with a teacher and a literature review, it was found that assessment for learning within IBSE is mainly portrayed as an individualistic, decontextualized activity without considerations of the studentsí everyday life. A change was proposed towards a view of assessment for learning in IBSE that recognized the inseparability of collective an individual consciousness (Roth and Radford, 2011) in the assessment activity.

Social moderation in formative assessment: More than meets the eye

Qualitative methods,Assessment methods and tools,Teacher professional development,Culture,Cooperative/collaborative learning

Louise Bourgeois, University of Ottawa, Canada; Dany Laveault, University of Ottawa, Canada;

Reaching viable assessment decisions in situations of uncertainty, where information on student learning is inconsistent, requires professional judgment (PJ). Social moderation has often been used to increase the reliability of summative judgments and while it makes sense to have teachers work collaboratively on formative assessment (FA), it is not clear whether it is useful or feasible. Furthermore, it is also unclear what aspects of PJ may be improved through social interactions. This presentation will describe the findings of a qualitative research study whose primary intent was to support the quality of teachersí assessment decisions in a formative context through collaboration. One well-documented issue on FA implementation has to do with teachersí individual representation of what FA involves in practice. Our basic hypothesis is that while teachers may share several different representations of FA, such representations are often focused on a single or limited aspect of FA. This partial representation is considered an important issue in teachersí collaboration and successful regulation of teaching and of studentsí learning through FA. While teachersí interactions may be a source of cognitive disequilibrium and may challenge individual conceptions of FA, to qualify as FA, teachersí assessments need to integrate more than one FA conditions at a time. The findings of the research reveal that changes in PJ in a formative context do occur as a result of the collaboration process. These changes, however, occur unequally among teachers and are influenced by many factors.

P 7

29 August 2015 13:45 - 15:15

Room Brown_B7

Symposium

Research methodology

What you see is what you say? On the relation between eye movements and verbal data

Keywords: Cognitive skills,Professions and applied sciences,Qualitative methods,Quantitative methods

Sig's: SIG 27 - Online Measures of Learning Processes

Chairperson: Els Boshuizen, Open University, Netherlands

Organiser: Els Boshuizen, Open University, Netherlands

Organiser: Charlotte Wolff, Open University, Netherlands

Discussant: Halszka Maria Jarodzka, Open University, Netherlands

When learning a new skill or acquiring new knowledge, we often adhere to some sort of visual representation of it, such as animations, pictures, or diagrams. In particular, when learning a profession, we often have to interpret complex visual patterns (e.g., a CT-scan image-set, a plan for a domotics installation, students' engagement in a disordered classroom). Thus, for education it is advantageous to understand how people process such visual representations. Two methods have delivered promising insights into this processing, namely tracking and recording of people's gazes while inspecting a visual image (i.e., eye tracking) and asking them to describe what they see and how they process the image (i.e., verbal protocols). In this symposium we discuss studies from different professional domains that combine verbal and visual data. We ask ourselves a) how can we best analyse such coordinated datasets, b) do these strategies result in different kinds of outcomes, and do these outcomes depend on the domain and/or expertise level, and c) what are the implications for research on learning? We'll explore research strategies that depart from the assumption of a loose coordination between visual processing and verbal utterances, mediated by complex cognitive processes relying on more than visual perception alone, as well as strategies that focus the direct link between visual and verbal processes. The aim of the symposium is to identify strengths and weaknesses of analysis methods, and critically consider the interaction between methodology used and the kind of outcomes found in the separate studies.

How do medical students analyse and interpret medical images?

Qualitative methods,Quantitative methods,Cognitive skills,Professions and applied sciences,Higher education

Helen Jossberger, University of Regensburg, Germany; Julian Eder, University of Regensburg, Germany; Hans Gruber, University of Regensburg, Germany; Christian Stroszczynski, University Medical Centre Regensburg, Germany; Rene Muller-Wille, University Medical Centre Regensburg, Germany; Els Boshuizen, Open University, Netherlands;

In the medical domain, expertise requires the ability to examine complex, information-dense, visual material, but we still know little about how the perceptual and cognitive system develops and how the learning process can be improved by training. A study is presented in which the gaze patterns and diagnostic skills of medical students before and after training in radiology were analysed to explore how they transform their knowledge. 34 medical students in the clinical phase participated. The subjects had to study 30 authentic x-ray images and decide whether a pathological finding was present and if so which one. Eye movements as well as verbal data were collected. Results show differences in pre- and post-test. In the post-test, students were more confident in their decision making and their diagnostic performance improved. Confidence and performance correlated significantly. However, the verbal data show that students faced difficulties in accurately naming the disease. No differences were found regarding time of inspection. The eye movements did not change significantly after training. Although the training has improved studentsí performance, we do not yet see differences in their visual behaviour. At the conference, we will discuss these findings and explain how the combination of eye movements and verbal data can improve our understanding of cognitive and perceptual processing.

The diagnostic strategies of clinical pathologists: combining visual and cognitive data

Comparative studies,Qualitative methods,Quantitative methods,Cognitive skills,Professions and applied sciences,Higher education

Thomas Jaarsma, Open University, Netherlands; Halszka Maria Jarodzka, Open University, Netherlands; Marius Nap, Atrium Medical Centre, Netherlands; Peter Verboon, Open University of the Netherlands, Netherlands; Els Boshuizen, Open University, Netherlands; Jeroen Van Merrienboer, Maastricht University, Netherlands;

According to the literature on visual medical expertise, diagnosticians are able to apply different viewing and reasoning strategies, even within a single diagnostic process. Additionally, it is stated that the range and nature of these strategies develops with expertise. However, these theories often focus on different aspects of visual diagnostic reasoning (cognitive or visual), without integrating them. This studyís aim was to integrate these theories and thus to explore if and how novices, intermediates, and experts in clinical pathology apply different visual diagnostic strategies in their diagnostic processes. A second, methodological aim was to explore ways to analyse visual and cognitive data sources in a combined and meaningful way. Participants were 13 pathologists (experts), 12 pathology residents (intermediates), and 13 medical students (novices). They each diagnosed seven microscopic images whereby two kinds of data were collected: microscope navigation (as a proxy of visual information processing) and

concurrent thinking aloud. Viewing strategy was investigated by measuring several dependent variables for microscope navigation in four equal time frames within a diagnostic process. Also, verbal data categories characteristic for different diagnostic phases were identified. The results showed three discriminate phases: an orientation phase, a search phase, and a conclusion phase. These phases were most prominent among experts. The verbal data supported these phases. Advantages and disadvantages compared with integrated analysis strategies will be discussed.

Considering the classroom: Linking vision and verbal interpretations to understand teachersí process

Comparative studies,Qualitative methods,Quantitative methods,Teacher professional development,Cognitive skills,Professions and applied sciences

Charlotte Wolff, Open University, Netherlands; Halszka Maria Jarodzka, Open University, Netherlands; Els Boshuizen, Open University, Netherlands;

To carry on with the task of teaching it is important that teachers remain continuously aware of what is happening in the classroom. What teachers see (i.e., vision) is tightly linked to what teachers say, do, and the kind of pedagogical decisions they make (i.e., cognition). Yet it is not enough for teachers to simply observe classroom events as they unfold, a teacher must also be able to interpret these events in a way that is meaningfully linked to the core task of teaching: promoting student learning. We conducted an exploratory study investigating expertise differences in the professional vision of 67 classroom teachers. Participants viewed authentic classroom lessons while their eye movements were tracked as they uttered their thoughts on these lessons out loud. The process of triangulating these two data sources requires making decisions which weigh heavily on the kinds of results achieved. We discuss methodological considerations encountered in the course of our research and frame these issues in terms of practical and theoretical implications for research on teacher vision and visual processing.

Verbal Data Analysis in ExpertóNovice and Cultural Comparisons of Teacher Gaze

Quantitative methods,Cultural psychology,Teacher professional development,Cognitive skills,Professions and applied sciences

Nora McIntyre, University of York, United Kingdom; Robert Klassen, University of York, United Kingdom;

The present paper demonstrates the relationship between teacher eye movements and verbalisation. Forty teachers participated, who taught in the United Kingdom and in Hong Kong. Tobii 1.0 glasses eye-trackers were used to record both the eye movements and speech of individual teachers simultaneously during secondary classroom teaching. Cued retrospective reporting (CRR) was subsequently used to obtain teacher commentaries of their gaze behaviour. Both the classroom and CRR verbalisations were aligned with eye movement data to identify gaze patterns relating to perception (information seeking) and those relating communication (information giving). It shall be demonstrated that verbal data play a central role in understanding eye movements in the context of classroom teaching.

P 8

29 August 2015 13:45 - 15:15

Room Brown_B2

Symposium

Teacher professional development

Transition from initial teacher education into teaching profession

Keywords: Competencies,Higher education,Mathematics,Teacher professional development,Video analysis

Sig's: SIG 11 - Teaching and Teacher Education

Chairperson: Gabriele Kaiser, University of Hamburg, Germany

Organiser: Sigrid Blomeke, University of Oslo, Norway

Organiser: Gabriele Kaiser, University of Hamburg, Germany

Discussant: Hilda Borko, Stanford University, United States

Starting from the evaluation of the effectiveness of teacher education and the professional knowledge of prospective teachers gained during teacher education, which was evaluated in the international study Teacher Education and Development Study in Mathematics (TEDS-M), continuation studies focus on the transition from initial teacher education into the teaching profession. The papers to be presented in the symposium with authors from Germany, Norway and USA further our understanding on the development of teachers and the necessity to enrich our understanding of competency including situation-specific skills, i.e. perception, interpretation, decision-making. The papers analyze the connections between content knowledge, pedagogical content knowledge, and mathematics topics based on a re-analyzes of TEDS-M-data and focus on the transition from teacher education into the profession based on data from the Follow-up study of TEDS-M. The commentary will highlight the development of teacher expertise and discuss directions and implications for further research.

Exploring Connections Between Content Knowledge, Pedagogical Content Knowledge, and Mathematics

Pre-service teacher education,Teacher professional development,Achievement,Higher education

Eileen Murray, Montclair State University, United States; Theodore Chao, The Ohio State University, United States; Jon Star, Harvard University, United States;

Past work on mathematics teachersí conceptual knowledge (CK) and pedagogical content knowledge (PCK) has resulted in mixed findings about the strength of the relationship between these constructs and how they develop. The current study uses data from the international comparative study ìTeacher Education and Development Study in Mathematics ñ Learning to Teach Mathematics (TEDS-M)î, which evaluated the professional knowledge of prospective teachers at the end of their teacher training, to examine the relationship between these knowledge types and the number of mathematics topics studied across different countries. Our findings indicate that the relationships between these constructs are weaker than expected, with the exception of a few countries including Germany, Poland, and the United States. The paper will present first explanations of these results.

Effects of school conditions and opportunities to learn on early career teachers

Quantitative methods,Teacher professional development,Mathematics,Higher education

Sigrid Blomeke, University of Oslo, Norway;

231 German primary teachers were assessed twice on their mathematics content knowledge (MCK), mathematics pedagogical content knowledge (MPCK) and general pedagogical knowledge (GPK) as well as on their beliefs about the nature of mathematics and the teaching and learning of mathematics. The first assessment took place at the end of teacher education, the second one four years later. Perceptual, interpretation and decision-making abilities were also assessed and this with video-vignettes. MCK and MPCK remained stable and GPK grew significantly during the transition. Beliefs on the nature of mathematics were significantly more dynamic at the second assessment whereas beliefs on the teaching and learning remained highly constructivist-oriented. Teachers who had higher MCK, MPCK and GPK as well as more process-oriented beliefs also performed significantly better on the video-vignettes with respect to abilities. In this talk, we will examine which conditions and processes contribute to a successful transition into the profession. Different types of opportunities to learn ñ university courses as well as school conditions ñ will be included in latent change modelling.

Factors influencing early career teachersí general pedagogical knowledge and skills

Quantitative methods,Video analysis,Teacher professional development,Higher education

Johannes Konig, University of Cologne, Germany; Stefan Klemenz, University of Cologne, Germany; Sarantis Tachtsoglou, University of Cologne, Germany;

We examined several facets of general pedagogical knowledge and skills of early career teachers, asking how they are associated with characteristics of teacher education, teaching experience, and working conditions. Declarative general pedagogical knowledge (GPK) was assessed via a paper-and-pencil test, while early career teachers' skills to perceive and interpret classroom situations were assessed via video-vignettes. Data from a follow-up study of TEDS-M Germany in 2012 were used, including a sample of 278 early career middle school teachers of mathematics. While teachersí declarative knowledge can be predicted by teacher education grades, teachersí skill to interpret classroom situations presented by videos can be predicted by

their amount of time spent on teaching relative to their overall working time, which is interpreted as a form of deliberate practice. Different competence profiles of pedagogical knowledge and skills are identified via latent-class analysis. Besides teaching experience, profiles are associated with generic teaching challenges (motivating students, disruptive student behavior) perceived by the teachers. Implications of findings for professional development of early career teachers are discussed.

Early Career Teachersí Professional Knowledge on Studentsí Errors in Mathematics

Quantitative methods,Teacher professional development,Mathematics,Higher education

Gabriele Kaiser, University of Hamburg, Germany; Nils Buchholtz, University of Hamburg, Germany; Lena Pankow, University of Hamburg, Germany;

Fast and accurate perception as well as knowledge-based judgments are widely accepted features of professional expertise. Noticing students and classroom situations, i.e. percepting studentsí errors under time pressure, interpreting and acting accordingly are well-known indicators of teachersí expertise (Sherin et al. 2011, Blomeke et al., 2014). In the field of mathematics education this can be identified by the fast recognition of studentsí mathematical errors by the teachers. One part of the Follow-up study of the international Teacher Education Development Study in Mathematics (TEDS-FU) with early career teachers focuses on this aspect of teachers' expertise. 171 German early career teachers teaching at lower secondary level participated in the study, in which they were asked to anticipate typical studentsí errors to a given mathematical topic. Afterwards according studentsí errors had to be identified under time limitation. First results of the study will be presented, amongst others analyzes on the relation of the anticipation time to the right or wrong answers of the test persons and the professional knowledge and the task are presented. No uniform pattern can be identified, in contrast the anticipation time is strongly influenced by the professional knowledge of the early career teacher as well as the level of complexity by the task. These findings confirm results of the expertise research , which emphasize that expert teachers act context-bound and focus more intensively if necessary (Chi, 2011).

P 9

29 August 2015 13:45 - 15:15

Room Brown_B4

Symposium

Classroom discourse

Student involvement in the classroom: Different perspectives and associations.

Keywords: Social aspects of learning,Social interaction,Teaching/instruction

Sig's: SIG 17 - Qualitative and Quantitative Approaches to Learning and Instruction

Chairperson: Anett Wolgast, The German Institute for International Educational Research (DIPF), Germany

Organiser: Anett Wolgast, The German Institute for International Educational Research (DIPF), Germany

Discussant: Jan Van Damme, KU Leuven, Belgium

This symposium brings together different views on student involvement. The concept of involvement means the intensity to which an idea is positively viewed by an individual and has an impact on behavior. Previous research focused either on the frequency with which students attended activities or time spent on tasks. So far, there is a lack of research regarding associations between student and/or teacher views on involvement and their effect on social behavior. Involvement is relevant for all students and teachers. Therefore, the first paper aims to analyse approaches and findings, including student involvement in general, as well as for pupils with additional needs. In the sense of inclusion, these approaches could also apply to all students. The second paper explores teacher and student views on perceived involvement and interaction in the classroom when there is an inspirational practice and high level involvement from both groups. The third paper deals with associations between teachers' emotions in the classroom and aspects of involvement, e.g. student engagement. It takes into account that student involvement or the lack thereof could impact teacher emotions and sense of well-being. The fourth paper focuses on associations between student subjective perspective-taking, involvement in the use of reading strategies in the classroom and previously read books. The amount of previously read books may influence the understanding of additional needs students by students without such needs. Exploring this symposium topic of involvement enhances our awareness of the synergies between learning and teaching that impact long term social behavior.

Bringing in the childís experience: How to capture the subjective experience of involvement

Qualitative methods,Student learning,Social aspects of learning,Learning in context

Gregor Maxwell, University of Tromso, Norway;

The ability to effectively capture the subjective experience of involvement of pupils with additional support needs will greatly improve the effectiveness of inclusive education. This will lead to an improved understanding of how to measure inclusion in terms of both policy and practice, and how it is operationalized. The study uses a narrative summary to review the findings from four studies where the ICF-CY has been used as a methodological tool. The aim is to look at the theoretical and practical validity of the application of the ICF-CY in the field of education with a view to enhancing inclusion of children with disabilities by providing a common language for describing inclusive educational settings. All four studies used the Linking rules developed by (Cieza et al., 2005) and the guidelines for coding presented in the ICF-CY, annex 2 (WHO, 2007). The studies differ in the type of information that was linked to ICF-CY codes and thus also the theoretical and practical problems experienced. A modification of the

construction and operation of participation is required if ICF-CY is to be used efficiently in inclusive education modification. A bi-dimensional approach to participation will achieve this.

Teacher emotions: relational antecedents and consequences

Quantitative methods,Teaching/instruction,Social aspects of learning,Motivation and emotion

Gerda Hagenauer, University of Bern, Switzerland; Tina Hascher, University of Bern, Switzerland; Simone Volet, Murdoch University, Australia;

Although teaching is an emotional endeavor, research on teacher emotions is a quite new field in empirical research. From previous research we know that interactions with students are a main source of teacher emotions. The present study explores the relevance of the quality of the teacher-student relationship, resulting from their interactions, for teacher emotions. Furthermore it addresses the consequences of positive emotional experiences of teachers on quality indicators of instruction as well as on teacher occupational well-being. 132 secondary teachers participated in the study. Using questionnaires, they rated their experienced joy, anger, and anxiety during classroom instruction, which the literature has identified as quality indicators of the teacher-student relationship, autonomy support in the classroom, and occupational well-being (e.g., satisfaction in the job). Teacher-student relationship was conceptualized as a multi-dimensional construct containing an interpersonal and a professional dimension, assessed by the factors closeness, student engagement, and lack of discipline. Hierarchical regression analyses revealed that an affective bond formed with students (=closeness) was the strongest predictor of teachersí joy, and anxiety (negative relation), whereas lack of discipline in class best predicted teachersí anger experiences. Student engagement was also a significant predictor of teacher anger and joy. Consecutive SEM analyses showed that teacher emotions impacted teachersí occupational well-being to a strong degree whereas the relevance of autonomy supportive strategies as indicators of instructional quality was significantly weaker. Overall, this suggests that models of teacher emotions should pay increased attention to positive relationships between students and teachers as relevant antecedents of teacher emotions.

Teacher and student voices: Perspectives from ëinspiringí classrooms

Mixed-method research,Student learning,Synergies between learning, teaching and research,Social aspects of learning,Social interaction

Ariel Lindorff-Vijayendran, University of Oxford, United Kingdom; Pamela Sammons, University of Oxford, United Kingdom; Alison Kington, University of Worcester, Institute of Education, United Kingdom; Lorena Ortega, University of Oxford, Department of Education, United Kingdom;

This paper presents selected findings from a small-scale mixed methods study of ëinspiringí teaching, commissioned and funded by CfBT. The overall aims of the study were to explore what inspiring teachers say about their practice, what they do in their classrooms, and the views of their students. The research focus was initiated by school principals as a professional development initiative, and the 'inspiring' teachers in the sample were nominated by schools.

This paper focuses specifically on teacher and student voices in the project, with the aim of understanding how the perspectives of these groups align, what they prioritize about teachers and lessons, and what their opinions and experiences reveal about their classroom relationships, activities and interactions. Sources of data included face-to-face individual teacher interviews and an exercise in which teachers ranked 17 teacher attributes in perceived order of importance. Studentsí views were accessed through questionnaire surveys with a combination of Likert-scale items and one open response question. The sample included 17 teachers from English primary and secondary schools. 203 students, from classes corresponding to 11 of the teachers, were surveyed. Findings showed that both teachers and students prioritized positive relationships and enthusiasm or enjoyment as key teacher and lesson characteristics; this was supported by both qualitative and quantitative data. Qualitative data elaborated upon some more specific relationship dynamics and lesson activities connected to these dominant themes. These results contribute to a previously unclear definition of ëinspirationalí teaching, and also have the potential to guide practice and development for teachers.

Student perspective-taking and their involvement in language classes

Quantitative methods,Student learning,Social aspects of learning,Learning in context

Anett Wolgast, The German Institute for International Educational Research (DIPF), Germany;

The current analysis is based on the Theory of Mind and the concept of empathy with a particular focus on the subjective cognitive perspective-taking as an aspect of social behavior. That means, someone is thinking from another personís view in a social situation rather than feeling oneís emotional experience. So far, there is a need for more information regarding whether differences in perspective-taking between students could be explained by their involvement in a class or class related activities. The aim is to investigate the subjective perspective-taking of N = 1,747 fifth grade students from 103 classes depending on their previously used reading strategies in the classroom and the amount of books they have read. Furthermore, associations between previously used reading strategies in the classroom and the teacher taught reading strategies are taken into account. Therefore, the studentsí view on perspective-taking, used reading strategies and the amount of books they have read were assessed. Moreover, teachers filled in questionnaires about which reading strategy they taught last year. First results from mediation analyses show an explained variance in perspective-taking by student reading strategies in a class and an explained variance in these strategies by the number of read books in the last half year. The findings lead to the conclusion that the involvement in the use of reading strategies and the amount of previously read books are relevant for the perspective-taking as an aspect of social behavior of these students.

P 10

29 August 2015 13:45 - 15:15

Room Green_A6

Symposium

Collaborative and cooperative learning

Constructive and interactive learning activities in collaborative learning

Keywords: Assessment methods and tools,Conversation/ Discourse analysis,Cooperative/collaborative learning,Instructional design

Sig's: SIG 6 - Instructional Design

Chairperson: Anne Deiglmayr, Swiss Federal Institute of Technology, Zurich, Switzerland

Organiser: Anne Deiglmayr, Swiss Federal Institute of Technology, Zurich, Switzerland

Discussant: Rachel Lam, National Institute of Education / Nanyang Technological University, Singapore

In effective collaborative learning, students typically engage in interactive as well as constructive learning activities. According to the interactive-constructive-active-passive-framework (ICAP; Chi, 2009), and supported by previous experimental research, interactive learning activities (e.g. knowledge co-construction in joint dialogues) are more effective for fostering deep learning than constructive learning activities (e.g. constructing an explanation individually). So far, however, research building upon the ICAP-framework has focussed on manipulating the instructional design (i.e. the intended learning activities), without analysing the learning activities actually taking place. This symposium brings together examples of process-level analyses that aimed to identify constructive and interactive learning activities actually occurring in collaborative dialogues. All four contributions employ analysis tools, such as coding schemes, in order to establish a link between constructive and interactive learning activities at the process level, and individual learning gains at the outcome level. The findings show how instructional design, such as the distribution of knowledge (Deiglmayr & Schalk), the availability of a collaboration script (Vogel et al.), the instruction to focus on differences vs. similarities (Mayweg-Paus et al.), or features of an intelligent tutoring system (Olsen et al.) affect the patterns of constructive and interactive learning activities in learners` dialogues. Taken together, the contributions confirm the proposed benefit of interactive over constructive learning activities for a range of individual learning outcomes. However, they also refine the ICAP-framework by pointing out important differences between various kinds of interactive learning activities and by demonstrating moderating effects of learner characteristics such as prior knowledge.

Assessing collaboration dialogues of students using an Intelligent Tutoring System for fractions

Conversation/ Discourse analysis,Educational technology,Peer interaction,Mathematics,Primary education,Computer-supported collaborative learning

Jennifer Olsen, Carnegie Mellon University, United States; Claudia Mazziotti, Ruhr-University Bochum, Germany; Nikol Rummel, Ruhr University Bochum, Institute of Educational Research, Germany; Vincent Aleven, Carnegie Mellon University, United States;

Collaborative learning is a complex task that can be better understood and evaluated through a careful analysis of the dialogue students engage in. When working collaboratively with an Intelligent Tutoring System (ITS), students get the benefit of both collaborative support and the cognitive support provided by the tutor. With both processes taking place at the same time, we wanted to understand how different collaborative talk types are associated with the errors elementary school students make while learning with an ITS. We developed a rating scheme based on the ICAP framework to provide insight about what is happening at the subgoal level of the tutor. Where many schemes focus on labeling good collaboration that would fall within the interactive category of ICAP, our rating scheme went beyond this to also classify other types of less effective talk. We found that interactive talk is associated with subgoals where more errors are made, compared to other types of talk. This may indicate that students are more likely to engage in sense-making activities after an error happens.

Interactive and constructive generation of principle-based explanations

Conversation/ Discourse analysis,Instructional design,Peer interaction,Mathematics,Computer-supported collaborative learning,Cooperative/collaborative learning

Anne Deiglmayr, Swiss Federal Institute of Technology, Zurich, Switzerland; Lennart Schalk, ETH Zurich, Switzerland;

We assessed how knowledge interdependence influenced students` participation in the interactive learning activity of co-constructing principle-based explanations. Triads of undergraduate university students learned three basic stochastic models in a computer-supported collaborative learning (CSCL) environment implementing a jigsaw-type collaboration script. In an individual preparatory phase, students studied a selection of worked examples exemplifying the application of the models in different contexts. Students (n=78) were randomly assigned to two conditions: In the model experts condition, each individual learner was trained on only one of the models instantiated in three different context stories. This condition thus created strong knowledge interdependence between triad members for the collaborative phase. In contrast, in the story experts condition, each learner was trained on a different context story which embedded all three principles, thus creating only superficial knowledge interdependence in the triad. We assessed students` constructive and interactive generation (Chi, 2009) of principle-based explanations (i.e. explanations referring to mathematically relevant principles) in the collaboration phase by extensive content analyses of chat protocols. Results indicate that prior knowledge moderated the effect of condition: Low prior knowledge learners showed higher levels of interactive learning activities in the story experts condition resulting in significantly better transfer performance in this condition. High prior knowledge learners, in contrast, showed high levels of both constructive and interactive explanations, and high performance scores, in both conditions. Thus, a lower degree of knowledge interdependence led to higher participation of low prior knowledge learners in interactive learning activities, and consequentially to higher individual learning outcomes.

The relevance of interactive and constructive learning activities in mathematical argumentation

Experimental studies,Educational technology,Argumentation,Peer interaction,Mathematics,Computer-supported collaborative learning

Freydis Vogel, Technische Universitat Munchen, TUM School of Education, Germany; Ingo Kollar, University of Augsburg, Germany; Elisabeth Reichersdorfer, TU Munchen, Germany; Stefan Ufer, Ludwig-Maximilians-Universitat (LMU), Germany; Kristina Reiss, Technische Universitat Munchen (TUM), Germany; Frank Fischer, Ludwig-Maximilians-Universitat (LMU), Germany;

In this study we investigated to what extent assumed beneficial collaborative learning activities used by two students while collaborating on mathematical proof tasks can explain positive effects of learning with collaboration scripts and heuristic worked examples on the acquisition of argumentation knowledge. A 2x2 experiment with the factors collaboration script and heuristic worked examples was conducted with N = 101 math teacher students. The students learned in dyads in a computer-supported learning environment on three consecutive days with three different problem-solving tasks in 45-minutes sessions. Derived from Chiís (2009) ICAP framework, we analyzed the learning processes of each learning session regarding the learnersí use of interactive (i.e. verbal contributions related to the partnerís contribution) and constructive (i.e. verbal contributions related to the learning material only) learning activities. Interactive contributions were further separated into interactive co-construction (i.e. relating to the partnerís contribution in a rather additive way) and interactive argumentation (i.e. criticizing or integrating the learning partnerís contributions). Results showed that learning with a collaboration script and learning with heuristic worked examples facilitated the use of interactive and constructive learning activities. Furthermore, only learnersí use of interactive argumentation during the collaborative learning process predicted the individual improvement of argumentation skills. We conclude that constructive and interactive activities might not be the collaborative activities that lead to better individual learning in general. Different collaborative learning activities rather have to be classified in a more detailed way such as the distinction between interactive argumentation and interactive co-construction.

Discourse = interactive? How to support interactive learning activities in online discourse

Conversation/ Discourse analysis,Pre-service teacher education,Argumentation,Peer interaction,Science education,Cooperative/collaborative learning

Elisabeth Mayweg-Paus, University of Muenster, Germany; Monja Thiebach, University of Muenster, Germany; Regina Jucks, WWU Munster, Germany; Maria Zimmermann, University of Munster, Germany;

According to Chi`s ICAP hypothesis (2009), interactive learning activities are most beneficial for learning. However, the effectiveness of interactive learning activities depends on several factors, such as discourse partnersí effort to build on the partnerís knowledge, and to integrate each otherís contributions (e.g. Kuhn & Udell, 2003; Paus & Jucks, 2012). Thus, effective interactive activities require the consideration and integration of multiple perspectives. Based on findings on perspective taking and elaborated information processing, we expected that focusing on differences should have beneficial effects on interactive learning activities when processing

science-related learning contents as well as on the development of a critical and sophisticated understanding. In the study, teachersí web search for scientific information was simulated including information from online journals and from dialogue with another person (via chat). The goal of the search was to give an information-based response to a parentís request on a science-related learning topic. In an experiment with n= 136 student teachers, we either established a difference or a similarity focus by instructing dyads to pay attention to differences or similarities in background information while discussing the topic. Dialogues were analysed with respect to individual and joint dialogue activities (Chi, 2009). Findings point to beneficial effects of a difference focus on the amount of joint interactive learning activities, on the quality of individual writing, and on the display of critical thinking. Instead, a similarities focus had positive effects on the perception of interpersonal relationship and motivation. Implications for improving joint interactivity in dialogues are discussed.

P 11

29 August 2015 13:45 - 15:15

Room Green_A7

Symposium

Writing

Understanding studentsí historical writing processes: A disciplinary perspective

Keywords: Competencies,Content analysis,History,Reasoning,Student learning,Writing/Literacy

Sig's: SIG 17 - Qualitative and Quantitative Approaches to Learning and Instruction

Chairperson: Monika Waldis, University of Applied Sciences, Switzerland

Organiser: Monika Waldis, University of Applied Sciences, Switzerland

Discussant: Gert Rijlaarsdam, University of Amsterdam, Netherlands

As students progress through the curriculum, literacy and content area learning become more interrelated, making academic progress increasingly dependent on the acquisition of specialized language skills and knowledge. Growing expertise comes along with knowledge of discipline specific use of language, argumentative skills and meta-cognitive knowledge which subsumes not only learning strategies but also the reflection on scientific work methods and epistemological foundations. Several scholars in the field of history education consider writing as a means to engage students in historical reasoning. This perspective is in line with writing-to-learn-approaches and conceptualizations of writing as a problem-solving activity. Thus, writing is seen as a tool for acquiring content knowledge, developing understanding and improving thinking skills. Conversely, studentsí texts can be used for the diagnosis historical thinking. This symposium brings together four different research approaches investigating studentsí writing

processes in history. Building upon the Anglo-American concept of ìhistorical reasoningî and the German concept of "narrative competence" different writing tasks were developed and implemented in schools. Based on empirical data the question of what kind of different reasoning processes students engage in when writing in history is examined investigating the influence of writing prompts and topic. Secondly, the effects of different writing instructions in order to foster pupilsí reasoning skills were explored. Thirdly, the development of writing processes is investigated to learn more about individual support needs. The symposiumsí main aim is to contribute to theory as well as to future curriculum interventions by providing a stronger understanding of studentsí historical writing processes.

Measuring historical competencies with open-ended writing tasks: A mixed methods approach

Experimental studies,Mixed-method research,Competencies,History

Christiane Bertram, University of Tubingen , Germany; Ulrich Trautwein, Institute of Education, Germany; Wolfgang Wagner, University of Tuebingen, Germany;

The process of deconstructing a historical narrative and creating oneís own narrative about the past are considered to be central competences of historical thinking (short description in English: Koerber, 2014). However, open-ended tasks seem to be limited for the assessment of studentsí narrative performance. In this paper, we present the theoretically-based development of open-ended writing tasks to assess studentsí narrative competence. The studentsí written work was gathered in the context of a randomized controlled intervention study (Bertram, Wagner, & Trautwein, in prep.). The study scrutinized the effectiveness of working with oral history interviews in history lessons about the ìPeaceful Revolution in the GDRî. After the intervention the students answered seven questions about three documents using primary sources and retrospective narratives concerning the demonstration in Leipzig at 9th October 1989. Among other outcomes, in this test studentsí insight in central historical concepts and epistemological principles of history were assessed with standardized test items. Studentsí open-ended written work (N = 190) was categorized in MAXQDA capturing several quality features derived from Ruesenís (2005) theory of narrativity and objectivity (e.g., empirical and narrative plausibility). The codes were exported as variables into SPSS. When scaling, several quality features of the responses were taken into account. Studentsí scores on the open-ended tasks were correlated with their scores on the standardized test items. The results suggest that the open-ended tasks suited to assess central competences of historical thinking.

Studentsí writing in history: The influence of topic and text format on historical reasoning

Experimental studies,Mixed-method research,Student learning,Competencies,History

Monika Waldis, University of Applied Sciences, Switzerland;

The theoretical conceptualization of ìnarrative competenceî is not yet fully developed in history didactics. However, it is commonly agreed that students should get insight into the argumentative and constructive character of historical narratives. It is hypothesized that

disciplinary writing processes could help students to develop their narrative skills. This paper presents an experimental study from the project ìnarratioî (Hodel et al. 2014; Waldis et al. 2015) investigating essays from 186 Swiss and German students (grade 9 to 11) in order to find out more about history specific writing processes and skills. Two thematic test booklets were developed broaching the issue of ìJapanese trade relations ìand the incident of the so-called ìReichsboykottì in National Socialist Germany. Whereas the first topic is rarely taught in school, the later topic is mandatory. Students were asked to take note of historical sources and to write a text focusing a self-selected text format. Afterwards they had to comment their emotional writing experience. Pupilsí essays were analyzed identifying elements of historical reasoning and argumentative patterns. Additionally the linguistic and argumentative text quality was rated. Findings show that the largely unprocessed topic (Japan) led to more frequent references to historical sources and information-based judgments. A dominance of value-based judgments was noted in the ìReichsboykottî narrations, thus rarely meeting the standards of historical reasoning. The examination of the two subjects evoked significantly different emotional responses among the pupils. To foster înarrative competenceî the later ñstrongly culturally shaped - issue seems not to be suitable.

Effects of writing instruction on historical reasoning: Quality and process characteristics

Experimental studies,Mixed-method research,Student learning,Reasoning,History

Martine Anne H. Braaksma, University of Amsterdam, Netherlands; Jannet van Drie, University of Amsterdam, Netherlands;

Developing studentsí abilities in historical reasoning is an important goal in history education. Writing can be considered an important means to engage students in historical reasoning. Since writing in history puts high demands on students, more insight is needed in effective writing instruction to promote historical reasoning. For that reason, we conducted two studies. In an experimental study, two types of instructions were compared: a general writing instruction and a discipline-based writing instruction. In addition, the effects of these instructions for students with a different initial writing ability were explored. Participants were 42 students (11th-grade), who followed a unit on the development of Dutch democracy and had to write an argumentative letter in which they argued the historical significance of a self-selected event or person. Students received a short writing instruction in two versions: a general writing instruction or a discipline-based writing instruction. Analyses focused on historical reasoning and global text quality. Results showed a positive effect of discipline-based instruction on the quality of historical reasoning; no effects were found on text quality. No differences were observed for initial good and weak writers. In a qualitative study, we studied the writing processes during the writing of the argumentative letter. Three initial strong writers and two initial weak writers (in the discipline-based writing instruction) wrote their letter while thinking aloud. Furthermore, their writing activities (and from five other writers) were logged with a key stroke logging program. Preliminary results showed differences in writing processes between initial weak and strong writers.

Historical Writing Development in Young Adolescents

Experimental studies,Mixed-method research,Student learning,Developmental processes,History

Susan De La Paz, University of Maryland, United States; Chauncey B. Monte-Sano, University of Michigan, United States;

Beyond defining historical writing as a genre, we know little about how studentsí historical writing develops over time. Although researchers such as McCarty Young and Leinhardt (1998) and Leinhardt (2000) have looked at growth in studentsí historical writing over time, their focus was on a selected sample of students in Advanced Placement classes. Embedded in a quantitative study investigating the intervention effects of an 18-day history and writing curriculum, the present study explores the development of disciplinary literacy in a subsample looking closer at younger adolescents, including those who struggle with reading and writing, students who are English learners and students with learning disabilities. Qualitative and descriptive analyses were used to examine studentsí historical argumentative essays from different points in the year, their completion of different parts of the disciplinary literacy apprenticeship (e.g., annotations), and whether and how students use those components of the apprenticeship in their subsequent essays.

P 12

29 August 2015 13:45 - 15:15

Room Brown_B8

Symposium

Emotion and affect

Emotions, motivation, and learning

Keywords: At-risk students,Learning disabilities,Mathematics,Motivation and emotion,Social aspects of learning

Sig's: SIG 8 - Motivation and Emotion

Chairperson: Tuija Aro, University of Jyvaskyla, Finland

Organiser: Tuija Aro, University of Jyvaskyla, Finland

Organiser: Tuire Koponen, Niilo Maki Institute, Finland

Discussant: Alexander Minnaert, University of Groningen, Netherlands

The symposium will be tackling into the intriguing associations between emotions, motivation, and learning among primary school pupils and their teachers. The symposium advocates the importance of better understanding of academic emotions, i.e., emotions related to achievement activities or achievement outcome (Pekrun, 2006). Although it is well known and accepted that

academic emotions are significantly related to childrenís motivation, learning strategies, cognitive resources, self-regulation, academic self-concept, and achievement (e.g., Pekrun et al., 2002; Valiente et al., 2012), our understanding on the developmental trends and on the associations between emotions and academic performance and pupil-teacher relationship is scarce. The aim of the symposium is to increase knowledge especially regarding mathematics anxiety and pupil-teacher relationship among primary school student on the basis of recent empirical research. Two of the presentations explore mathematics attitude and anxiety and the associations between these and performance in mathematics as well as the effects of gender and age. One presentation investigates differences in studentsí emotional and motivational patterns in mathematics as well as their impact on learning and performance. And the forth presentation focuses on the association between teacher-perceived conflict and teachersí closeness in relationship with their students and the students self-rated engagement. Taken together, these presentations may stimulate an evidence-based discussion on academic emotions and advocate the importance of establishing a comprehensive approach to learning and learning difficulties where emotions and pupil-teacher relationship are considered aside with the more traditional cognitive factors.

The relations between student engagement and teacher-student relationship at grade 6

Quantitative methods,Emotion and affect,Social interaction,Primary education,Motivation and emotion

Anna-Maija Poikkeus, University of Jyvaskyla, Finland; Marja-Kristiina Lerkkanen, University of Jyvaskyla, Finland; Kati Vasalampi, University of Jyvaskyla, Finland; Heli Muhonen, University of Jyvaskyla, Finland; Annukka Rajalahti, University of Jyvaskyla, Finland; Helena Rasku-Puttonen, University of Jyvaskyla, Finland;

The quality of teacher-student relationship (Hamre & Pianta, 2005; Rimm-Kaufman, Curby, Grimm, Nathanson, & Brock, 2009) has been shown to influence studentsí academic achievement, engagement, and adjustment. In the present study we examined the association between teacher-perceived conflict and closeness in relationship with their students and the students self-rated engagement at Grade 6. The data comprised 250 Finnish students (141 boys, 109 girls) who participate in a follow-up study. The affects in the student-teacher relationship were assessed using teacher ratings (STRS; Pianta 1992), and studentsí cognitive and affective engagement were assessed using student self-ratings (SEI; Appleton et al., 2006). The findings indicated that the more conflicts the teachers perceived in their relationship with the student, the less engagement the same student reported. Moreover, students whose teachers reported high closeness in the particular teacher-student relationship were more inclined to report perceiving school as relevant, they had clearer future educational aspirations and goals, and their experienced support for their engagement from their family. These findings indicate in line with previous studies that affects experiences in the teacher-student relationship are associated with studentsí engagement, and low extent of conflicts, in particular, promotes engagement among student approaching the transition to secondary school.

Students at risk: How do their emotion and motivation in mathematics develop?

Quantitative methods,Student learning,At-risk students,Learning disabilities,Primary education,Motivation and emotion

Stephanie Lichtenfeld, Ludwig-Maximilians-Universitat, Munich, Germany; Reinhard Pekrun, Ludwig-Maximilians-Universitat (LMU), Germany; Katrin Arens, German Institute for International Educational Reserach / DIPF , Germany; Alex Morin, Australian Catholic University, Australia; Kou Murayama , University of Reading, United Kingdom; Kristina Loderer, Ludwig-Maximilians-Universitat (LMU), Germany;

Emotions such as enjoyment of learning, hope, pride, anger, anxiety, shame, hopelessness, or boredom as well as different types of motivation (e.g, intrinsic, extrinsic motivation) are pervasive in achievement settings. Different kinds of emotions and motivation have been found to be critically important for studentsí learning and performance. The focus of the present study is to investigate differences in respect to emotions and motivation between students at risk and not at risk for learning disabilities. Specifically, we seek to investigate differences in studentsí emotional and motivational patterns in mathematics as well as their impact on learning and performance. Given that studentsí at risk may struggle more when trying to perform well, a vicious circle could strengthen the bidirectional effects between low motivation, negative achievement emotions, and studentsí achievement for these students.

Attitudes to mathematics in primary school children

Quantitative methods,Student learning,Achievement,Attitudes and beliefs,Primary education,Motivation and emotion

Ann Dowker, University of Oxford, United Kingdom; Karina Bennett, St Hildaís College, Oxford , United Kingdom; Louise Smith, St Hildaís College, Oxford, United Kingdom; Gemma Thomas, St.Anneís College, Oxford , United Kingdom; Tuire Koponen, Niilo Maki Institute, Finland;

44 Grade 3 children and 45 Grade 5 children from English primary schools were given the British Abilities Scales Basic Number Skills subtest, and a Mathematics Attitude and Anxiety Questionnaire, using pictorial rating scales to record their Liking for maths Self-rating for maths, Anxiety about maths, and Unhappiness about poor performance in mathematics. Attitudes were generally positive and did not change between Grade 3 and Grade 5. Boys rated themselves higher than girls, but did not differ significantly in actual performance or in other attitudes. Overall, Anxiety was not related to actual performance, but Self-rating was. Implications of the findings are discussed.

Relation between math anxiety and performance in primary school: Do the grade or gender matter?

Quantitative methods,Student learning,Achievement,Emotion and affect,Primary education,Motivation and emotion

Riikka Sorvo, University of Jyvaskyla, Finland; Tuire Koponen, Niilo Maki Institute, Finland; Pilvi Peura, University of Jyvaskyla, Finland; Helena Viholainen, University of Jyvaskyla, Finland; Tuija Aro, University of Jyvaskyla, Finland; Mikko Aro, University of Jyvaskyla, Finland;

Mathematics anxiety has been found to have many kinds of effects on achievement in mathematics. Still, the previous studies about learning difficulties in young children have usually concentrated in cognitive issues. With regard to mathematics anxiety, little is known about the early development of mathematics anxiety and its relation to early math skills. The purpose of this study was to examine the relation between mathematics performance and mathematics anxiety in primary school children. Participants (n=1326) were primary school children from grades 2 to 5. They were asked questions of shortened version of Mathematics Anxiety Questionnaire (Thomas & Dowker, 2000) and their performance was assessed with Addition and Subtraction Fluency tests and Basic Arithmetics test. The findings indicated that children with lowest mathematic skills reported higher mathematics anxiety than the others. Correspondingly, also children who reported higher anxiety about mathematics performed on a lower level than the others. Within the group reporting high mathematics anxiety, girls performed on a lower level than boys. These results indicate that anxiety about mathematics should be paid attention already in the very first school years. The fact that math performance of girls seems especially strongly affected by math anxiety, deserves also attention in early math education.

P 13

29 August 2015 13:45 - 15:15

Room Brown_B5

Symposium

Technology-enhanced learning

Bringing simulations and serious gaming to the classroom, aligning technology, teachers and students

Keywords: Educational technology,Game-based learning,Model-based reasoning,Science education,Second language acquisition,Teacher professional development

Sig's: SIG 20 - Computer Supported Inquiry Learning

Chairperson: Wouter R. van Joolingen, Utrecht University, Netherlands

Organiser: Wouter R. van Joolingen, Utrecht University, Netherlands

Organiser: Sui Lin Goei, Windesheim University of Applied Sciences, Netherlands

Discussant: Margus Pedaste, University of Tartu, Estonia

Recently research into the use of advanced computing technology in education has been one of the central themes in educational research. Studies on the design of and interaction with computer simulations and serious games are abundant. However, having a successful simulation or game implemented in real classrooms is a highly non-trivial problem. Conditions at schools may be unfavorable when compared to the research lab and teachers may have trouble aligning the principles underlying the technology with their preferred way of teaching. For instance, the simulation or game may provide a specific structure to the learning process such as a strict implementation of an inquiry cycle, incompatible with a more open-ended approach by a teacher. This means that there should be an additional cycle of design, not of technology but for the education with the technology. Using simulations or games requires that teachers design the particular way in which the technology will be used. Teachers should be supported in this design and develop professional competencies to be able to adopt their use of technology for their educational goals. In this symposium we present four case studies in different educational contexts, varying from special needs education and language education to two cases in the science classroom. All cases use advanced technology to achieve specific goals that would be harder to reach without technology. For each case, particular difficulties and solutions to support teachers will be presented. In the discussion we will try to find common ground and general lessons learned.

Model-based Learning using Virtual Pink Dolphins for Special Needs Education??

Case studies,Special education,At-risk students,Model-based reasoning

Yiyu Cai, Nanyang Technological University, Singapore; Sui Lin Goei, Windesheim University of Applied Sciences, Netherlands;

The number of reported Autism Spectrum Disorder (ASD) has increased rapidly in the recent year. Virtual Reality (VR) as a technology has been studied an alternative intervention for the ASD for special education and neuro-rehabilitation. This research is interested in the development of model-based learning using virtual pink dolphins for learning in a virtual environment for children with ASD. An immersive room was created, presenting a virtual basin in which pink dolphins swim. Children use the environment to learn language and counting. The study shows, that, in particular for this special group of children, designs of the tools is not enough. Careful design of the learning situation and specific tasks is needed to reach a level of acceptance by students, teachers and parents.

Investigating an Intervention to Support Computer Simulation Use in Whole-Class Teaching

Qualitative methods,Quantitative methods,Educational technology,Science education

Nico Rutten, Utrecht University, Netherlands; Jan Van der Veen, Twente University, Netherlands; Wouter R. van Joolingen, Utrecht University, Netherlands;

Going beyond simply measuring the effectiveness of a teaching approach with computer simulations during whole-class science instruction, we investigated the interaction between

teachers and their students as well as searched for mechanisms in the pedagogical context related to teachers' implementation of the intervention. Our quasi-experimental design involved having five teachers teach Newtonian mechanics with computer simulations to parallel classes of their upper secondary students, in an Accustomed condition and a Peer Instruction condition. We investigated the pedagogical interaction between teachers and their students, which was expected to be affected by the interventionís performance support for the teacher as well by the teacherís learning support for the students. Learning effects as revealed by gains from pretest to posttest to delayed posttest did not consistently favor either condition. Identified mechanisms occurring in the pedagogical context that could explain our findings include: teacherís sense of ownership of the lesson, familiarity with the intervention conditions, and rivalry with the researcherís approach. Suggestions for future research related to these mechanisms are offered.

Identifying hurdles for large scale uptake of games and simulations in the classroom

Design based research,Educational technology,Teaching/instruction,Game-based learning,Inquiry learning

Koen Veermans, University of Turku, Finland; Tomi Jaakkola, University of Turku, Finland; Gabriela Rodriguez Padilla, University of Turku, Finland;

In educational gaming and simulation environments students are engaged in active exploration process instead of merely witnessing something being presented, based on the evidence that students learn better when they have an active role in the learning process (Bransford, Brown & Cocking, 2000). In many gaming and simulation environments the learning process is fairly structured and controlled, because evidence shows that many students have difficulties without proper assistance and guidance (Mayer, 2004). However, what is increasingly worrying is that the benefits of (pre-)structuring the learning process seems to be taken for granted. There has been surprisingly little discussion about the potentially adverse (i.e. negative) effects of structuring of the learning process. In our view, these potentially adverse effects should be acknowledged and more explicitly addressed before we can expect simulations and games to play a more significant role in formal education. In the current paper explores some of the effects that the (pre-)structuring of the learning process in educational games and simulations can have on two key stakeholders, students and teachers. Based on two examples from our own research this paper argues that in order to obtain learning outcomes, different learners need different structuring, but also that the strong focus on outcomes in both simulations and games might very well go at the expense of two other important aspects of active learning: process and interest. It also argues for the acknowledging the importance of teachers as gatekeepers for preventing and resolving these issues in the learning situation.

A Study on the Effectiveness of a Serious Game for English Pronunciation

Educational technology,Second language acquisition,Language (Foreign and second),Primary education,Secondary education

Sui Lin Goei, Windesheim University of Applied Sciences, Netherlands; Wim Trooster, Windesheim University, Netherlands; Esther Oprins, TNO, Netherlands;

This paper summarises a study on the effectiveness of a serious game LINGO Online for learning English pronunciation for native Dutch speaking students in two primary schools and two secondary schools in the Netherlands. Besides, the effectiveness and the working mechanisms of the serious game, the educational context was analysed to determine relevant context parameters. During 8 weeks students either played the game (experimental group) or followed ëbusiness as usualí lessons (control group). Data were collected regarding L1 decoding skills, L2 exposure, L2 decoding and proficiency and L2 pronunciation performance, studentsí learning features, game features, teachersí expectations, and teaching practice. Results showed that the students in primary schools profited significantly more after playing the game. This effect was positively related with learning features such as motivation and engagement. Though game features did not correlate directly with the learning effect, they did correlate with the learning features. This effect was not found for the students in the secondary schools. It is assumed that the game features contribute to the learning effect mediated by learning features like motivation. Conclusions on the effectiveness of this serious game and a model for the mechanism of action of this innovative learning tool are discussed.

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29 August 2015 13:45 - 15:15

Room Green_A5

Symposium

Self-regulation

Using Process Data for Understanding and Fostering Self and Socially Regulated Learning Behavior

Keywords: Assessment methods and tools,Computer-assisted learning,Metacognition

Sig's: SIG 16 - Metacognition

Chairperson: Christoph Sonnenberg, University of Wuerzburg, Germany

Organiser: Christoph Sonnenberg, University of Wuerzburg, Germany

Organiser: Maria Bannert, Mensch-Computer-Medien, Germany

Discussant: Joachim Wirth, Ruhr-University Bochum, Germany

Research in self and socially regulated learning (S-SRL) is increasingly interested in using process data for the investigation of sequential and temporal dynamics in learning behavior (Azevedo, 2014). In addition, recent studies are accompanied by the application of new methods for analyzing S-SRL data as events (Molenaar & J?rvel?, 2014). The analysis of process data obtained by online measurements of learning activities (e.g., using video recordings, think-aloud

protocols, or computer log files) provides new evidence of how self-regulated learning unfolds during studying. Moreover, identified patterns of regulated learning activities can be related to product data, especially to different levels of learning outcome. Examining these patterns (e.g., temporal dynamics of learning activities) is crucial for fostering S-SRL through instructional support based on process structures. All contributions of this symposium aim at presenting how process data can be used for enhancing our theoretical and practical understanding of S-SRL behavior. New insights in regulatory processes provide implications for the design of effective instructional support, for example providing information for adaptive scaffolds. Additionally, research on the complex nature and dynamics of regulatory processes forms the foundation for the development of a micro-level theory of S-SRL which is currently missing in the literature (e.g., by extending Winne & Hadwin's COPES-Model). Hence the aim of this symposium is to discuss the significance of empirical research focusing on process data in respect of the theoretical understanding of S-SRL as well as the development of instructional support.

Capturing patterns of regulated learning for investigating engagement in collaborative learning

Video analysis,Assessment methods and tools,Self-regulation,Higher education,Cooperative/collaborative learning

Jonna Malmberg, University of Oulu, Finland; Hanna Jarvenoja, University of Oulu, Finland; Sanna Jarvela, University of Oulu, Finland; Ernesto Panadero, Universidad Autonoma de Madrid, Spain; Marta Darvasi, University of Oulu, Finland;

The field of self- and socially shared regulation of learning is increasingly interested in how temporal sequences of events (e.g., activating prior knowledge; constructing task perceptions and goals; using and adapting strategies) emerge in different stages of the learning process (Azevedo, 2014; Bannert & Sonnenberg, 2014; Molenaar & Chiu, 2014; Volet, Vauras, Khosa & Iiskala, 2012). Examining temporal sequences of events that incorporate phases of regulated learning can increase our understanding of the process in which students engage when learning alone or in groups. Earlier research considering sequential and temporal aspects of regulated learning has focused on individual learning, but there is not much research focusing to capture temporal sequences of regulated learning in collaborative learning. The aim of this study is to explore the temporal order of regulated learning in different stages of the collaborative learning process. The research questions are: 1) What shared regulatory phases the collaborating groups engage with when working with collaborative tasks? and 2) What types of sequential patterns of regulated learning exist in the course of collaborative learning? Participants included 44 teacher education students collaborating in small groups over two monthís course. Data involves 88 hours of video recordings which is analyzed using qualitative content analysis and lag sequential analysis. The results show the most used socially shared regulation phases and how these phases intertwine to each other as groups engage to shared regulation of learning. Later, we will provide more detailed analysis on how these shared regulatory processes evolve during collaboration.

Effects of sequences of socially regulated learning on group performance

Conversation/ Discourse analysis,Assessment methods and tools,Self-regulation,Primary education,Cooperative/collaborative learning

Inge Molenaar, Radboud University Nijmegen, Netherlands; Ming Ming Chiu, Purdue University, United States;

Past research shows that regulative activities (metacognitive and relational) can aid learning performance and that sequences of cognitive, metacognitive and relational activities affect subsequent cognition. Extending this research, this study examines whether low, medium or high performing groups show particular sequences of socially regulated learning. Scaffolded by a computer avatar, 54 primary school students (working in 18 groups of 3) discussed writing a report about a foreign country for 51,338 turns. Statistical discourse analysis (SDA) of these sequences of talk showed that greater likelihood of high cognition in a turn of talk is linked to high group performance as well as monitoring three turns before low cognition sequences. Extended sequences of high cognition are linked to medium or high group performance. Low cognition ñ high cognition sequences are linked to low or medium group performance and series of low cognitions are linked to low group performance. The results indicate that different sequences among studentsí cognitive, metacognitive and relational activities are linked to levels of performance. These insights can inform a micro-temporal theory of socially shared regulation, showing how relations between cognition, metacognition and relational activities support group performance.

Using process data to examine self-regulatory processes during learning with MetaTutor

Experimental studies,Educational technology,Self-regulation,Science education,E-learning/ Online learning,Computer-assisted learning

Michelle Taub, North Carolina State University, United States; Roger Azevedo, North Carolina State University, United States; Nicholas Mudrick, North Carolina State University, United States; Seth A. Martin, North Carolina State University, United States; Federico Scholcover, North Carolina State University, United States; Jesse Farnsworth, North Carolina State University, United States;

The current study examined college studentsë self-regulated learning while they used MetaTutor to learn about a complex science topic. MetaTutor is a multi-agent intelligent tutoring system that includes four pedagogical agents to detect, model, track, and foster SRL. Learners were randomly assigned to either a control (no prompts or feedback from pedagogical agents) or an experimental group (received learning prompts and feedback regarding their use of cognitive and metacognitive SRL processes from four pedagogical agents) during a two-hour session. Several types of data were collected from each participant at various points throughout the learning session. They included self-report measures of emotions, motivation, and agent persona; multi-channel process data (i.e., log-files, facial expressions of emotions, eye-tracking, and electrodermal data); and pretests and posttests of the science topic. The results indicate that participants assigned to the experimental group learned significantly more than those in the control condition. Our results will focus on the process data (specifically on episodes of learner-agent interactions throughout the learning task) since they provide the best evidence regarding

the temporally unfolding nature of cognitive, metacognitive, and affective SRL processes deployed by learners in real-time.

Analyzing the effectiveness of metacognitive prompts using process data

Experimental studies,Teaching/instruction,Self-regulation,E-learning/ Online learning,Computer-assisted learning

Christoph Sonnenberg, University of Wuerzburg, Germany; Maria Bannert, Mensch-Computer-Medien, Germany;

Research in self-regulated learning (SRL) shows that many learners have difficulties in performing regulatory activities spontaneously, which results in lower learning outcome. Therefore, the general aim of our research is to provide instructional support by using metacognitive prompts for the activation of strategic learning processes during hypermedia learning. Despite of positive effects of metacognitive prompts in previous studies, there is still a high number of students who do not benefit from the provided support. Referring to adaptive scaffolding, it is necessary to consider conditions when a prompt is needed and when it might be effective. Therefore, an analysis of the learning process is required in order to dissect conditions for effective prompts. Think-aloud data of an experimental study in which the experimental group was supported by metacognitive prompts (n = 35) was used to distinguish between effective and non-effective prompts by considering the increase of metacognitive utterances following a prompt. Results show that about half of the presented prompts induced metacognitive learning activities. Moreover, the number of these so-called ìeffective promptsî correlates positively with learning outcome. Finally, the occurrence of orientation activities before the prompt presentation supports its effectiveness, whereas the occurrence of reading activities impedes it. In general, our findings demonstrate the benefits of investigating the effectiveness of metacognitive support using process data, which can in turn provide implications for the development of a micro-level theory of SRL processes and the design of scaffolds.

P 15

29 August 2015 13:45 - 15:15

Room Cyan_F1

Symposium

Science education

The interplay between teachersí attitudes, their knowledge and scientific inquiry teaching practice

Keywords: Attitudes and beliefs,Science education,Self-regulation,Teacher professional development,Teaching/instruction

Sig's: SIG 11 - Teaching and Teacher Education

Chairperson: Robbert Smit, University of Teacher Education St. Gallen, Switzerland

Organiser: Sandra van Aalderen-Smeets, University of Twente, Netherlands

Discussant: Angelika Meier, University of Teacher Education, Switzerland

To participate in the knowledge society, 21st century skills are needed. Science is seen as a promising context because it is not only a body of accepted knowledge, but also involves processes that lead to these skills (Hilton, 2010) Exploring the Intersection of Science Education and 21st Century Skills: A Workshop Summary2010 National Academies Press0309150647(Hilton, 2010), such as the agreement between deep thinking and problem solving and typical scientific inquiry activities like engagement, exploration, explanation, elaboration, and evaluation. Scientific inquiry teaching strategies promise to foster students' interest in science and teachers' attitudes and knowledge are crucial for the implementation of these practices. Transforming teacher practice across the EU will require significant and sustained investment in continuous professional development based on sound research studies (Osborne & Dillon, 2008. Science education in Europe: Critical reflections132008 London: The Nuffield Foundation(Osborne & Dillon, 2008). We will present research on both pre- and in-service teacher-training projects to improve the practice of scientific inquiry teaching and the teachers' attitudes and/or knowledge. A third presentation reports on a teacher-training project designed to develop teachers' diagnostic and teaching skills with regard to the students' competence to use scientific modelling. And finally, a fourth teacher-training project documents the impact of scientific inquiry teaching on students' motivation and their self-regulation competencies.

Primary teachers conducting inquiry projects: The effect on attitude towards science and inquiry

Quantitative methods,Pre-service teacher education,Attitudes and beliefs,Science education,Primary education,Inquiry learning

Sandra van Aalderen-Smeets, University of Twente, Netherlands; Juliette Walma van der Molen, University of Twente, Netherlands;

This paper presents the results of a theoretically informed professionalisation project that was set up to improve primary teachersí attitudes towards science and attitude towards inquiry. A positive attitude towards science is of fundamental importance for teachers when stimulating interest in science among primary school students. However, most professional development projects for primary teachers focus mainly on classroom didactics and traditional science lessons. It is questionable whether this approach results in improving teachersí attitudes. One approach to change teachersí attitudes towards science and inquiry is by having them experience a genuine inquiry process themselves. This paper presents a study on the effects of a year-long teacher inquiry project, on teachersí attitudes towards science and towards inquiry. The effects were investigated using a pre-test-post-test experimental control group design (N = 62). After

participating in the inquiry project, primary teachers showed significantly improved attitudes towards teaching science on two out of six attitude components and significantly improved their attitudes towards inquiry on two out of five attitude components compared to the control group. The results of this professionalization project will be linked to a previously developed theoretical framework of teachersí attitude towards science and will be discussed in light of the results of another professionalization course that was more explicitly focused on teachersí attitudes, rather than their inquiry skills. We will contrast these two approaches to expose key elements in primary teacher professional development for successful attitude improvement regarding science education.

Attitudes and knowledge of pre-service biology teachers planning science inquiry lessons

Quantitative methods,Pre-service teacher education,Biology ,Science education,Secondary education,Inquiry learning

Robbert Smit, University of Teacher Education St. Gallen, Switzerland;

Learning to create an inquiry-based lesson is a critical element of teacher education (Windschitl, 2003). Not every teacher who possesses high content knowledge (CK; Shulman, 1986) is confident in teaching science (Harlen, 1997). However, both are necessary to foster studentsí learning in scientific inquiry (Kanter & Konstantopoulos, 2010). Van Driel, Beijaard, & Verloop (2001) recommend the use of peer coaching to help develop science teachersí pedagogical content knowledge (PCK) towards a reform-oriented curriculum, with inquiry as a central element. However, little remains to be known about the interplay between attitudes, CK, and PCK when teachers are planning science lessons. As part of our research we try to uncover the role of attitudes and knowledge in relation to the quality of planned inquiry lessons. Our intervention study, KUBeX, focuses on the impact of collaborative lesson planning in pre-service teachers. As part of the research we investigated the effects of pre-service teachersí knowledge and beliefs about teaching scientific inquiry on the quality of the collaborations and the lesson plans. KUBeX is a binational project involving three Swiss universities and one German university. Participants were pre-service teachers pursuing qualifications as lower secondary biology teachers (N=112). In this contribution we will present initial findings about the interplay of student beliefs, CK and PCK in relation to scientific inquiry. These results will allow us to look in a later step at the impact of attitude and knowledge on the quality of scientific inquiry lesson planning.

How to foster pre-service biology teachers/diagnostic and teaching skills regarding model competence

Content analysis,Quantitative methods,Pre-service teacher education,Science education,Primary education,Inquiry learning

Sarah Lena Guenther, Freie Universitat Berlin, Germany; Dirk Krueger, Freie Universitat Berlin, Germany; Annette Upmeier zu Belzen, Humboldt-Universitat, Germany;

The role of the use of models as a tool for scientific inquiry in biology education has not yet been established (Kahn 2011). Fleige et al. (2012) revealed that teachers require more than an elaborate and in-depth understanding of models and modelling in order to implement appropriate modelling activities in their lessons. Moreover, there is a need to improve pre-service biology teachersí diagnostic and teaching skills as part of their professional competencies (e.g. Shulman 1986). This intervention study, therefore, aims to foster pre-service biology teachersí model competence as well as their diagnostic and teaching skills with regards to biological models (current sample size: N=95). The presentation describes the developed program with a special focus on the case method as the methodical approach and on the effects of the program. The programsí development is evaluated with a pre-post experimental-control group design comprising of different quantitative and qualitative measurements (e.g. open ended-items and test cases as diagnostic instruments). Findings reveal that model competence could be developed successfully in the experimental (n=76; U=7.304; p.001; r=.59; Wilcoxon-test) and control group (n=19; U=3.535; p.001; r=.57). The analysis of the test-case-data, which is still ongoing, will provide insight into the development of the diagnostic and teaching skills. The development in the described competencies (model competence and diagnostic as well as teaching skills) will also be discussed.

The role of the teacher: Investigating the impact of the CREST inquiry-based learning programme

Quantitative methods,Pre-service teacher education,Self-regulation,Science education,Inquiry learning,Motivation and emotion

Julie Moote, King's College London, United Kingdom;

The CREativity in Science and Technology (CREST) scheme, a student-led inquiry programme is currently being implemented in schools across the United Kingdom to increase student engagement and motivation in science. Building on the findings of Moote, Williams & Sproule (2013), the central aim of this research was to explore the influence of CREST participation on students' self-regulated processes and related motivations. This study additionally investigates how different classes of students responded to the CREST programme regarding changes in their self-reported levels of the key self-regulation and motivational constructs measured. Through discussions relating to teacher effects of the intervention, a series of practical recommendations are provided. This study followed a quasi-experimental design with a control class (n =18) and nine ëCRESTí classes (n =160) of students between the ages of 12 and 13 years from an individual school in Scotland. A questionnaire was administered to all students prior to CREST participation, after CREST completion, and again four months later to a subsample of CREST students (n=90). The questionnaires included items from: the Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich & De Groot, 1990); the modified Five Component Scale of Self-Regulation (FCSSR, MacLellan & Soden, 2006); and the Science Motivation Questionnaire (SMQ, Glynn et al., 2009). A series of paired- and independent-samples t-tests were conducted to investigate changes in self-reported levels of self-regulated processes and related motivations. Multivariate one-way analyses of variance were also conducted to investigate classroom differences in response to the intervention.

P 16

29 August 2015 13:45 - 15:15

Room Green_A1

Symposium

Moral development and religious education

Happy Victimizer Phenomenon in adulthood ñ developing alternative explanations for moral functioning

Keywords: Developmental processes,Emotion and cognition,Morality,Motivation and emotion

Sig's: SIG 13 - Moral and Democratic Education

Chairperson: Eveline Gutzwiller-Helfenfinger, University of Teacher Education of Lucerne, Switzerland

Organiser: Brigitte Latzko, University Leipzig, Germany

Discussant: Dorit Alt, Kinneret College on the Sea of Galilee, Israel

Recent research suggests that the happy victimizer phenomenon can no longer be considered as restricted to young children only. The phenomenon appears also in adolescence and adulthood (D?ring, 2013; Heinrichs et al., submitted; Nunner-Winkler, 2013). However, the happy victimizer pattern (HVP) in adulthood does not seem to characterize an individual?s particular stage of development, but rather to represent a context-specific pattern of moral judgments, emotion attributions, and justifications showing intrapersonal variation across situations (Heinrichs et al., submitted). Recent results have encouraged a discussion about how to measure the HVP in adulthood (Heinrichs, et al., submitted). Alternative ways to grasp the HVP suggest a distinct phenomenon which seems to have an impact on moral development and behavior. Against this background the HVP in adulthood is explained from different theoretical perspectives: (1) a moral-cognitive approach emphasizing the context-specificity of moral judgments; (2) a developmental approach focusing on the role of moral emotions; (3) an action-oriented approach stressing the role of ambivalence towards cognition, emotion, motivation or volition; and (4) a behavioral approach targeting the relation between the HVP and deviant behavior among adolescents.

The Happy Victimizer in Adulthood ñ Re-Construction of a Phenomenon

Qualitative methods,Developmental processes,Emotion and cognition,Morality

Eveline Gutzwiller-Helfenfinger, University of Teacher Education of Lucerne, Switzerland; Brigitte Latzko, University Leipzig, Germany;

This presentation contributes to a developmental approach focusing on emotions as being of key significance in explaining the happy victimizer phenomenon (HVP) among adults. Based on findings of our own research on moral emotions within the happy-victimizer paradigm we posit that a purely cognitive approach to explain the HVP is overly to narrow. Instead, we argue that emotion attributions serve as a source for moral motivation. By identifying new dimensions (i.e., deontic judgment; own action choice; self-constructed emotion attributions) to explain the complexity of moral functioning in adulthood the current studies contribute to a theoretical (and methodological framework) that integrates both cognitive and emotional processes to bridge the gap between moral thought, emotion, and action.

The Happy Victimizer Pattern among Adolescents

Quantitative methods,At-risk students,Developmental processes,Emotion and cognition,Morality

Bettina Doering, Leibniz Universitat Hannover, Germany;

The following paper is based on the happy victimizer pattern (Nunner-Winkler & Sodian, 1988) and on functionalist theories of emotions (Bretherton, Fritz, Zahn-Waxler & Ridgeway, 1986, p.530). Those theories state that emotions can motivate human behavior. As within a moral conflict strong moral emotions can occur, moral emotion attributions are used to measure moral motivation (Nun-ner-Winkler & Sodian, 1988). Within literature (Krettenauer, 2011; Malti & buchmann, 2010; Nunner-Winkler, 2008) it is not clear how moral motivation develops between late childhood and adolescence. Therefore a study with 1.221 4th graders (M = 10.05; SD = 0.45), 815 7th graders (M = 13.18; SD = 0.54) and 2891 9th graders (M = 15.18; SD = 0.58) was conducted to compare the strength of moral motivation in these three age groups. Moral motivation was measured by emotion attributions within two moral conflicts (Malti & Buchmann, 2010; Nunner-Winkler, Meyer-Nikele & Wohlrab, 2007). Analyses revealed a decrease of moral motivation between 4th and 9th grade (Cramerís Vconflict 1 =.19, p.001; Cramerís V conflict 2=. 21, p.001). The results are in line with earlier research (Krettenauer, 2013; Malti & Buchmann, 2010) and lead to the assumption of a non-linear developmental process of moral motivation.

How to explain the context-specific occurrence of the Happy-Vicitimizer Pattern in Adulthood

Mixed-method research,Developmental processes,Morality,Vocational education,Lifelong learning,Motivation and emotion

Gerhard Minnameier, Goethe-Universitat Frankfurt, Germany;

The Happy-Victimizer-Phenomenon (HVP) has been explained in terms of a lack of moral motivation (see e.g. Nunner-Winkler, 2007). This view has been criticized on systematic grounds (see Minnameier 2010; 2012; 2013). The alternative to the classic explanation is the ìcognitive approachî to HVP, which explains HVP in terms of a specific moral stage, rather than as a lack of motivation to act according to some other moral principle. Based on literature from experimental economics and an empirical study analyzing situation-specific moral decisions,

feelings, and the participantsí reflections, it can be shown that not only there are almost 30 per cent Happy Victimizers, but that most of their happy victimizing appears to be fully rational (where the motivational explanation implies that its moral-cognitive irrationality). Whatís even more, both the theoretical analysis and the empirical results cast strong doubts on normative issues based on the motivational explanation, since it implies a general homogeneous moral orientation where situation-specific adaption, i.e. acting differently and following different moral principles in different situations, seems to be more appropriate.

Do Adult Happy Victimizers Use Cognitive Control Strategies? ñ An Action-theoretical Approach

Emotion and cognition,Morality,Social development,Motivation and emotion

Karin Heinrichs, Goethe-Universitat Frankfurt, Germany;

The Happy-Victimizer-Pattern (HVP) has been studied as a pattern arising typically among young children and that normally overcomes during childhood. However, current studies show that the HVP also emerges in adolescence (Doring, 2013) and adulthood (Heinrichs, Minnameier, Gutzwiller-Helfenfinger & Latzko, subm.; Schroder, 2012). How could we explain the HVP in adulthood and what impact could this pattern have on the individualís behavior? Currently, different approaches to explain this HVP are discussed (Minnameier, 2013; Gasser et al., 2013). In this paper an action-theoretical approach is applied which directly allows suggesting hypothesis what the HVP could mean for acting. Referring to this action-oriented approach it is assumed that the HVP points to individuals experiencing a cognitive, emotional or motivational ambivalence: the person knows and feels committed to a moral rule, but, otherwise, is driven by non-moral motives towards breaking the rule. Thus, he or she experiences an inner struggle on the way to forming an intention and to overcome a given situation. To come to a decision and to get committed to a particular way behavior, action theory assumes that there is a need to apply cognitive control strategies (Sokolowski, 1993). To specify these control strategies we referred to emotion regulation theory (Frenzel et al., 2009). In an interview study we identified cases in which cognitive control strategies were applied to argue for a way of acting or to justify attributed (positive) emotions. The results of content analysis point to the fact that people showing the HV pattern mostly used emotion regulation strategies.

P 17

29 August 2015 13:45 - 15:15

Room Yellow_G2

Symposium

Mathematics education

Advances in Research on Fraction Learning: From Cognitive Processes to Mathematical Achievement

Keywords: Achievement,Assessment methods and tools,Cognitive development,Developmental processes,Mathematics

Sig's: SIG 3 - Conceptual Change

Chairperson: Drew H. Bailey, University of California, United States

Organiser: Joke Torbeyns, KU Leuven, Belgium

Organiser: Michael Schneider, University of Trier, Germany

Discussant: Andreas Obersteiner, Technische Universitat Munchen (TUM), Germany

Fraction understanding and fraction arithmetic are important but difficult topics in mathematics education curricula worldwide. Recent research on fractions has broadened and deepened theories of mathematical learning and development. However, despite the increasing number of studies on students' and adults' knowledge and skills in the domain of fractions, insight into the specific underlying mental structures and learning processes as well as their concurrent and developmental relations are still limited. This symposium brings together four contributions that demonstrate recent advances in this field of research. The studies focus to varying degrees on fraction understanding, fraction arithmetic, and relations to third variables, such as mathematical school achievement. One of the studies analyses differences between types of fractions. Two studies investigate the relations between fraction understanding and fraction arithmetic skills and how they develop or differ between countries. One study analyses the relation between fraction magnitude understanding and broader mathematical school achievement as assessed by standardized achievement tests. The methods used in these studies range from eye-tracking, over cross-cultural designs and latent trait-state models of longitudinal data to large-scale studies of student achievement. Overall, the studies paint a detailled picture of fraction learning, its cognitive underpinnings and its role in the broader context of mathematical learning. Fractions are multi-componential symbolic mathematical expressions that provide learners with complex challenges as well as unique learning opportunities. The discussion will integrate the findings, and reflect on challenges for future research in this domain from educational and psychological points of view.

Differential processing of fractions ñ Evidence from eye-tracking

Experimental studies,Cognitive skills,Numeracy,Mathematics

Hans-Christoph Nuerk, Psychology, Germany; Stefan Huber, Leibniz-Institut fur Wissensmedien (IWM), Germany; Julia Bahnmuller, Leibniz-Institut fur Wissensmedien (IWM), Germany; Korbinian Moller, Leibniz-Institut fur Wissensmedien (IWM), Germany;

Fraction processing has received significant interest in recent years. While at first all fractions were treated as one type, some studies postulated different ways of processing for fractions with same nominators, same denominators and mixed fractions, for which both types differ. In two eye-tracking studies we explore how these different fraction types are processed and further

explore differences within those fraction types. We observed that in a magnitude comparison task that fractions with common components eye fixations are relatively more frequent on the relevant components, which are not identical. Cognitive control attenuates these fixation patterns. Relevant components are even more frequently fixated in blocks in which the other component is always identical. In the second experiment, we explored mixed fractions more thoroughly. We investigated different types of congruency of components with the overall comparison. Numerator congruency led to strong congruency effects, while for different denominator congruencies inconsistent results were obtained. We conclude that fraction processing is highly complex and depends on the type of fraction processed and cognitive control mechanisms specific for that that type of fraction and the experimental setting. We suggest that education about fractions must be tailored to fraction types, cognitive control and the underlying mechanisms responsible for dealing with particular fraction types.

Conceptual and procedural knowledge of fractions are improved but not integrated by instruction

Cognitive development,Conceptual change,Developmental processes,Mathematics

Joke Torbeyns, KU Leuven, Belgium; Julia Hering, Universitat Trier, Germany; Nena Petric, Universitat Trier, Germany; Michael Schneider, University of Trier, Germany;

Studies from several decades and continents showed that fraction arithmetic is a particularly difficult subdomain of mathematics for students. Studentsí procedural knowledge about fraction arithmetic is oftentimes incomplete and includes faulty strategies. Several authors suggested that a lack of conceptual understanding might underlie studentsí problems with acquiring and using the correct computational procedures. The integration of fraction concepts and fraction procedures might help students to better understand which procedural strategies are correct and when they can be applied. In the current study, we investigated with 193 students how the absolute amounts of conceptual and procedural knowledge as well as their inter-correlations vary between Grade 5 and Grade 7 as well as between three regions with different curricula (Flanders in Belgium, Baden-Wurttemberg and Brandenburg in Germany). The results indicate strong main effects for grade level and region along with substantial interaction effects on the amounts of knowledge. All forms of instruction provided in the three regions improved studentsí fraction concepts and procedures but differed in when and how strongly they did. In contrast, the correlations between conceptual and procedural knowledge were small and not significantly different from zero for almost all combinations of grade level and region. Instruction in all three regions increased knowledge without integrating it. Even students with high conceptual knowledge were apparently not able to apply this knowledge on procedural tasks. The results demonstrate the need for experiments and field studies into how instructional strategies can foster the integration of fraction concepts and procedures.

Co-Development of fraction arithmetic skills and fraction magnitude understanding in students

Cognitive development,Conceptual change,Developmental processes,Mathematics

Drew H. Bailey, University of California, United States; Nancy Jordan, University of Delaware, Andorra; Nicole Hansen, University of Delaware, United States;

The apparent contribution of childrenís fraction knowledge to their later mathematics achievement, along with childrenís poor knowledge of fraction concepts and procedures, has prompted several recent studies of the development of childrenís fraction knowledge. The current study addresses important limitations in previous research on the co-development of fraction arithmetic skill and fraction magnitude understanding by applying a state-trait model to a longitudinal dataset containing measures of 536 childrenís knowledge of fraction concepts and procedures from 4th to 6th grade. The state-trait model controls for the relatively stable factors that affect different types of studentsí fraction knowledge similarly throughout their development. This novel approach to examining the co-development of two types of knowledge diminishes bias in estimates due to unobserved variables (e.g., cognitive or non-cognitive skills, previous knowledge) that affect both types of knowledge. Consistent with a bi-directional model of the development of fraction concepts and procedures, in which knowledge of one type facilitates learning of the other type, we found evidence that fraction arithmetic skill predicted later fraction magnitude understanding, and vice versa. Transfer in both directions between fraction arithmetic skill and fraction magnitude understanding appears to be more likely to occur later in the development of childrenís fraction knowledge, after fraction arithmetic with unlike denominators has been taught in school. The finding suggests a need for investigation of productive ways to link fraction magnitude understanding to fraction arithmetic procedures and vice versa during instruction.

The Number Line Estimation Task as a Diagnostic Tool

Cognitive development,Conceptual change,Developmental processes,Mathematics

Michael Schneider, University of Trier, Germany; Romain Martin, University of Luxembourg, Luxembourg; Sonja Ugen, University of Luxembourg, Luxembourg; Martin Brunner, University of Luxembourg, Luxembourg;

The number line estimation task is frequently used to assess studentsí understanding of numerical magnitudes which is a central component of a broader number sense. In the task, a number and a number line are presented. The line is empty except for the startpoint and the endpoint which are labeled. The participants have to indicate the position of the given number on the number line. The task has been found to be related to arithmetic competence and broader mathematical achievement with elementary school children in the domain of whole numbers. Recent studies with small samples found similar correlations for number line estimation with fractions and older students. In the current study we investigated the relations between number line estimation with fractions, math achievement and a wide range of student characteristics in a sample of 6.443 ninth-graders from Luxembourg. A standardized math achievement test explained 28% of the variance on the number line estimation task with fractions. School form (21%), whole-number estimation (16%) and achievement in German or French (13-19%) also were strongly related. In contrast, a wide range of domain-specific person characteristics (mathematical anxiety, self-concept, interest, test motivation) as well as a wide range of domain-general person characteristics (biological age, gender, immigration status, conscientiousness and

parentsí socio-economic status) were only weakly related and each explained less than 5% of the variance. The results demonstrate that the number line estimation task can be a helpful tool for diagnosing number sense in the domain of fractions.

P 18

29 August 2015 13:45 - 15:15

Room Yellow_G3

Symposium

Learning in context

Learning across education and workplace settings: theoretical and empirical contributions

Keywords: Competencies,Integrated learning,Learning in context

Sig's: SIG 14 - Learning and Professional Development

Chairperson: Carmela Aprea, Friedrich-Schiller-University Jena, Germany

Organiser: Viviana Sappa, Swiss Federal Institute for Vocational Education and Training (SFIVET), Switzerland

Organiser: Stephen Billett, Griffith University, Australia

Discussant: Paivi Tynjala, University of Jyvaskyla, Finland

Growing interest at the scientific and policy levels in optimizing and integrating vocational learning across education and workplace settings arises now that both sets of experiences are seen as being worthwhile, but optimally when combined. However, to understanding how to optimize and integrate learning across education and workplace settings requires greater conceptual clarity and grounded empirical evidence. This symposium contributes to this goal by combining theoretical and empirical papers from different countries, dealing with learning conceptualizations of experiences and experiencing across educational settings and workplaces in secondary and tertiary education. The first paper is a theoretical contribution (from Australia) refreshing the conceptualization of learning experiences across these learning environments. The key objective is to provide a comprehensive conceptual model where both contextual contributions and the active roles of individuals are acknowledged and valued. The second (Switzerland) and the third (from Australia) papers both investigate individuals' ways of understanding vocational learning and teaching across schools and workplaces. The contributions of each learning site and reciprocal relationship extended across them are described by learners, teachers and in-company trainers. In the fourth paper (the Netherlands and Sweden), the focus shifts to individuals' ways of learning across boundaries, by analyzing the different

ways in which boundaries are perceived by learners and how learning occurs across those boundaries. Together, this symposium offers fresh accounts about learning across education and workplaces and addresses the conference theme by combining scientific knowledge with what is understood and experienced by learners as they reconcile their experiences across the two settings.

A socio-personal account of integrating learning across tertiary education and practice settings

Student learning,Professions and applied sciences,Higher education,Workplace learning,Learning in context,Lifelong learning

Stephen Billett, Griffith University, Australia;

Having experiences in different social and physical settings is a routine experience for many, if not most, people and is part of everyday cognition. However, in current educational practice, great attention is being given to how students can engage in and learn from and then integrate experiences in work settings with those they encounter in their tertiary education institution. What is proposed here is that these experiences and individualsí experiencing of them, can best be understood through a socio-personal account that acknowledges how the contributions of individualsí experiences across the life course shape what and how they construe and construct what they experience in the immediacy of the moment: the process of experiencing. Generated through on a systematic and focused review of relevant literature, socio-personal account seeks to reconcile diverse accounts of what constitutes and shapes individualsí integration of experiences from perspectives that privilege both individual and social constructivist accounts (Billett, 2014). At one level, the manuscript is mechanism to acknowledge the need for both these perspectives and their reconciliation. That ëintegrationí is premised on how individuals come to experience what is afforded them in both settings and their personal mediation of those experiences or their summation. It also holds that reconciliations can also be a fairly routine aspect of human cognition, albeit with some significant personal outcomes, for those who are seeking to reconcile tertiary studentsí experiences in both work and tertiary education settings. Some implications arising from such an account are advanced at the end.

Conceptions of vocational learning and teaching across school and workplace: An interview study

Content analysis,Phenomenography,Competencies,Vocational education,Integrated learning,Learning in context

Viviana Sappa, Swiss Federal Institute for Vocational Education and Training (SFIVET), Switzerland; Carmela Aprea, Friedrich-Schiller-University Jena, Germany;

The integration of learning across different learning sites constitutes undoubtedly an important yet challenging task for each Vocational Education and Training (VET) system. Although various integrative teaching and learning models have been developed and several reform endeavours were fostered, their implementation is made complex by several factors. In

particular, moving in the socio-cultural and phenomenographic perspectives, we consider the individual ways of representing the relationship between learning at school and in the workplace as implicit filters that potentially influence the experiences and actions of key VET actors. Beginning with these considerations, this study aims to explore different ways of conceptualising vocational learning across learning sites in the Swiss VET system. Semi-structured interviews were conducted with 26 vocational school teachers, company trainers and apprentices, who were involved in apprenticeship programmes in the two fields of industry and business and administration. The data were analysed by combining data-driven (phenomenography) and theory-driven (content analysis) text analysis procedures. Four ways of conceptualising vocational learning across multiple learning sites were identified: i) as separate learning experiences; ii) as complementary learning experiences; iii) as experiences mediated by intercompany training centres; and iv) as experiences integrated at the school level. Qualitative differences in conceptions emerged in relation to the socio-cultural view of the schoolñworkplace connectivity. Differences in conceptions of actors (teachers, in-company trainers and apprentices) and between professional fields (industry and business and administration) were also identified and will be presented and discussed.

Connections between learning in educational institutions and workplaces: Australian case study

Case studies,Phenomenography,Vocational education,Workplace learning,Integrated learning,Learning in context

Sarojni Choy, Griffith University, Australia;

Connectivity between what is taught in educational institutions and in the workplace has significance for how well students learn in preparation for productive work performances as they enter employment. Yet, according to Akkerman and Bakker (2012) and Fuller and Unwin (2011) connectivity of learning in the two sites still remains problematic. Sappa and Aprea (2014) propose that it is the conceptions of key stakeholders such as learners, workers, managers, supervisors and teachers that have implications for connectivity of learning in educational institutions and workplaces. Presented here are the findings from an Australian case study on how vocational education and training students, teachers and workplace trainers conceptualise connectivity between what is learnt in educational institutions and workplaces that offer experiential learning for students. The study was guided by two research questions: i) How do vocational education and training students, teachers and workplace trainers conceptualise connections between learning in educational institutions and workplaces?; and ii) To what extent do their conceptions align? Data were collected through semi-structured interviews with the 30 participants in study fields of business and administration, and technology. Responses to the interview questions were analysed using the phenomenographic method (Marton and Booth 1997; Akerlind 2005a, b; Paakkari et al. 2011) to examine any qualitative differences in how participants understood and experienced learning in the two sites (the phenomenon).

Studentsí learning processes in vocational education in school and workplaces

Qualitative methods,Student learning,Competencies,Engineering

Liesbeth Baartman, Utrecht University of Applied Sciences, Netherlands; Nina Kilbrink, Karlstad University, Sweden;

Students in vocational education often experience problems in the transitions between school and work. This research starts from a comparative boundary crossing approach, focusing on the values of differences between contexts. The research questions take a narrative approach and start from studentsí experiences and focus on (1) what do students experience that they learn in school and work, (2) how do students integrate what they learn in these contexts? Individual and group interviews were conducted with students, teachers and workplace supervisors. A narrative approach was used for the interviews, letting the respondents tell their experiences. Data analyses used sensitizing concepts derived from the literature on boundary crossing and learning processes in vocational education. Preliminary results show that students do not experience a boundary between school and work, whereas teachers do. Learning processes were found in terms of ìperceptionî, ìtransmissionî and ìexperiencesî. Assessments cause problems as students feel that they cannot show ìwhat they are proud ofî or what they really did in the workplace.

P 19

29 August 2015 13:45 - 15:15

Room Blue1_C1

Symposium

Early childhood education

Differential effects of child care quality in young children

Keywords: Developmental processes,Early childhood education,Self-regulation,Social development,Teaching/instruction

Sig's: SIG 5 - Learning and Development in Early Childhood

Chairperson: Martine Broekhuizen, Utrecht University, Netherlands

Organiser: Antje von Suchodoletz, New York University Abu Dhabi, United Arab Emirates

Organiser: Joana Cadima, University of Porto, Portugal

Discussant: Paul Leseman, Utrecht University, Netherlands

A large body of research has shown that high child care quality can be a means to promote children's development (Yoshikawa et al., 2013). However, effects are often small and in some studies even non-existent. It has been suggested that these inconsistent findings can be explained by individual differences in effects of early child care (Phillips, Fox, & Gunnar, 2011; Pluess & Belsky, 2009). The symposium aims to add important information on possible moderators of

child care quality and brings together four papers from different European and Middle East countries (the Netherlands, Portugal, Germany, and the United Arab Emirates). The first paper investigated whether the effects of child care quality on child socio-emotional development depended on children's self-regulation skills and gender. The second paper examined whether effects of child care quality on children's behavioral and emotional self-regulation skills were moderated by child temperament and gender in two groups of children: At-risk and non-risk children. The third study investigated whether the association between quality of teacher-child interactions and social participation was moderated by children's social skills, behavioral problems, and preschool dosage. The fourth study investigated whether child temperament and child stress moderated the link between child care quality and children's behavioral and academic adjustment in kindergarten. Taken together, these studies represent a comprehensive exploration of mechanisms by which individual characteristics and child care quality may work together in shaping children's development. Discussion will focus on the communalities and differences of these studies, as well as their implications for practice.

Individual differences in effects of child care quality: The role of self-regulation and gender

Student learning,Teaching/instruction,Developmental processes,Social development,Early childhood education

Martine Broekhuizen, Utrecht University, Netherlands; Marcel van Aken, Utrecht University, Netherlands; Judith Dubas, Utrecht University, Netherlands; Paul Leseman, Utrecht University, Netherlands;

The current study investigated whether the relation between child care process quality and childrenís socio-emotional behavior depended on childrenís affective self-regulation skills and gender. Participants were 545 children (Mage = 27 months) from 59 center-based child care centers in the Netherlands. Multi-level analyses showed that child care quality was positively related to childrenís teacher-rated social competence one year later. In addition, both children with low affective self-regulation skills and boys demonstrated lower levels of teacher-rated social competence when exposed to low quality child care. However, children with low affective self-regulation skills showed more social competence in the case of high quality child care, suggesting mechanisms of differential susceptibility. No main effects of child care quality or interactions were found for teacher- and parent-rated externalizing behavior and parent-rated social competence. The findings emphasize the importance of considering child affective self-regulation skills and gender in understanding the effects of child care quality. High quality child care can be a means to strengthen child social development.

Differential effects of temperament, gender, and child care quality on non-risk and at-risk children

Teaching/instruction,At-risk students,Developmental processes,Self-regulation,Early childhood education

Joana Cadima, University of Porto, Portugal; Tiago Ferreira, University of Porto, Portugal; Karine Verschueren, KU Leuven, Belgium; Teresa Leal, University of Porto, Portugal; Joana Vieira, University of Porto, Portugal; Paula Matos, University of Porto, Portugal;

In this study, we examine whether the effects of child care quality on childrenís self-regulation skills depend on childrenís temperament and gender, for two groups of children, children from families with multiple risks (at-risk) and non-risk children. Participants were 441 children (n = 90 classrooms), 208 (n = 47 classrooms) of which from social disadvantaged areas. Teachers reported on child temperament and emotional regulation skills. Trained observers rated classroom quality via live observations in typical preschool day using the Classroom Assessment Scoring System Pre-K (Pianta, La Paro & Hamre, 2008). Behavioral regulation was assessed using direct measures. Analyses using multigroup structural equation modeling showed that, for at-risk children, classroom quality was positively associated with childrenís behavioral self-regulation. For non-risk children, moderating effects were found such that children with difficult temperament and boys demonstrated lower levels of behavioral self-regulation in low quality classrooms, but not in high quality classrooms. Regarding emotional regulation, moderating effects were found for at-risk children between classroom quality, child temperament and gender. No main effects or moderations were found for emotional regulation for non-risk children. These results showed complex interactions between individual characteristics, classroom quality and family risk and the need to consider the interplay among them when investigating the effects of higher quality childcare.

Teacher-child relationship quality and social participation in the preschool setting

Teaching/instruction,Developmental processes,Social development,Social interaction,Early childhood education

Ines Peceguina, University Institute of Lisbon (ISCTE-IUL), Portugal; Cecilia Aguiar, ISCTE-Instituto Universitario de Lisboa, Portugal; Joao Daniel, ISPA-University Institute, Lisbon, Portugal; Joana Cadima, University of Porto, Portugal; Nadine Correia, ISPA-University Institute, Lisbon, Portugal; Margarida Fialho, ISPA-University Institute, Lisbon, Portugal;

Previous research suggests that teacher-child secure relationships associates with peer social competence and global social-psychological adjustment (Birch & Ladd, 1998; Buyse, Verschueren, Doumen, Damme, & Maes, 2008; Pianta & Steinberg, 1992). This study examined whether the relations between classroom quality and teacher-child dyadic relationshipsí quality and peer acceptance and friendship were moderated by social skills, behavior problems, and dosage. 168 preschool-aged children from 42 classrooms (4 children per classroom) were recruited. The Classroom Assessment Scoring System was used to measure classroom quality regarding Emotional Support and Classroom Organization. The Student-Teacher Relationship Scale was used to assess teacher-child relationships. Peer acceptance and friendship were obtained from sociometric measures. Results indicate that classroom variability predicts differences in reciprocal friendships, with higher levels of emotional support, unexpectedly, predicting fewer friends. An interaction between dosage and teacher-child closeness was also found. High closeness plus high dosage, predicted fewer friends; high closeness plus low dosage, predicted more friends. This result resembles that of McAulife, Hubbard, and Romano (2009),

who found that positive teacher behaviour negatively predicted peer liking. Given that only high dosage predicted fewer friends, this may suggest that closeness with the teacher has a different meaning whether it happens in early stages of the relationships (both teacher-child and peers), or in the context of continuing ties. Perhaps a deeply investment in this relationship (the childís and/or the teacherís) in a long-term, limits the time and the social resources necessary to properly develop strong and reciprocal friendships with the peers.

Child characteristics as predictors of young children's adjustment to kindergarten

Teaching/instruction,Developmental processes,Social interaction,Early childhood education

Antje von Suchodoletz, New York University Abu Dhabi, United Arab Emirates; Ross Larsen, Brigham Young University, United States; Lydia Barza, Zayed University Abu Dhabi, United Arab Emirates;

The differential susceptibility hypothesis (Belsky & Pluess, 2009) assumes that some children display enhanced sensitivity to both adverse and supportive rearing experiences. Two studies are reported that used a domain-specific approach to child care quality and investigated whether child temperament (study 1) and child stress (study 2) moderated the link between child care quality and childrenís behavioral and academic adjustment in kindergarten. Participants were 205 German children (50% girls; study 1) and 73 children of different nationalities attending schools in the United Arab Emirates (43% girls; study 2). In both studies, the Classroom Assessment Scoring System CLASS Pre-K was used to indicate child care quality with regard to Emotional Support (ES), Classroom Organization (CO), and Instructional Support (IS) (Pianta et al., 2008). In study 1, children with a difficult temperament scored lower on the behavioral and academic tasks in classrooms with low levels of ES and CO whereas in classrooms with high levels of ES and CO they scored higher. Contrary to our expectations, children without temperamental difficulties scored lower in high quality classrooms compared to low quality environments. This suggests that although these children do well in low quality classrooms they might not get enough attention in high quality classrooms where teachers might particularly support children with difficult temperaments. Results for study 2 will be included in the final presentation (the analyses for the hair cortisol concentration analyses are not yet completed).

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29 August 2015 13:45 - 15:15

Room Green_A2

Symposium

Teacher professional development

Impact on practice as a quality aspect for validity and realibility in educational research

Keywords: Communities of practice,In-service teacher education,Synergies between learning, teaching and research,Teacher professional development,Teaching/instruction

Sig's: SIG 11 - Teaching and Teacher Education

Chairperson: Mona Holmqvist Olander, University of Gothenborg, Sweden

Organiser: Mona Holmqvist Olander, University of Gothenborg, Sweden

Discussant: Ming Fai Pang, University of Hong Kong, China

In this symposia lesson and learning study used as methods in teacher-collaborative research projects are discussed. The research methods have two aims; to improve classroom instruction and subject didactic research as well as to contribute to general theoretical development in educational science. However, as the models also are used in school-development projects the usage oft he models for scientific purposes have to be scrutinized and discussed regarding scientific quality. In this symposium the usage of the methods in different parts of the world (Austria, Japan and Sweden) will be discussed regarding the scientific quality and ethical issues. The methods are discussed and promblematized regarding the standards of scientific quality as well as the impact on practice. Questions raised are: what criteria distinguish what is a research project from a school-development project; what are the characteristics of good quality research with implications for the practice; what differs the role of the researcher from the role of the teacher; which ethical issues are particularly important to relate to when scientists are working close together with teachers in research projects and who is in charge of collaborative research projects and why?

Lesson Study as an ìimprovement scienceî for teachers? Kaizen-culture and lifelong learning

Qualitative methods,Video analysis,Instructional design,Teacher professional development

Hiroyuki Kuno, Nagoya University, Japan;

This research presentation aims to describe differences between academic research methods and research methods by practitioners and tries to identify practical research method belongs to an improvement science that is practice-based research for improve quality of practice. Practical researches such as Lesson Study, Learning Study and Action Research, which has been rapidly developed and recognized as research by practitioners since last several decades in 20th century, have been giving big impact on science in terms of its research strategies. One of the major characteristics of Lesson Study is its flexible framework and bottom-up approach for lesson quality improvement and teachersí professional development. That is why Lesson Study is introduced in different countries such as Singapore, Indonesia, Malaysia, US, UK and Japan and extended year by year. Schools and institute of teacher education in these countries have been conducting Lesson Study for teachersí professional development and lesson improvement in different approaches according to their own needs and requirements. Lesson Study is so flexible and practitioner-centered approach that teachers are able to introduce it and modify with their

colleagues for their requirements. This characteristic of Lesson Study as research method is one of the reasons why Lesson Study is spreading globally and simultaneously solving the local problems even in different context (Arani, 2014).

Teachers as researchers - an issue of bias in qualitative research?

Design based research,Video analysis,Synergies between learning, teaching and research,Teacher professional development

Helene Bergentoft, University of Gothenburg, Sweden; Mona Holmqvist Olander, University of Gothenborg, Sweden; Per Selin, x, Sweden;

In this paper a meta-analysis of four teacher researchersí projects is made to describe how ecological validity can be used to prevent bias to occur when teachers work as researchers. The analysis is based on four educational design research projects, learning studies, managed by two teachers as researchers who both have implemented each two educational design research projects; one at the same school as they work in and the other one at another school. The first two studies are about the school subject Physical Education and Health and in total 95 upper secondary school students and 7 teachers from two different schools participated in this study. Studies three and four is about the school subject English as foreign language and 29 students in grade 8 (13-14 years old) and 6 teachers participated in the first part and 78 students from the first year of college (16-17 years old) and 9 teachers in the second part. The teachers have used mixed-methods in their studies; interviews, written and oral tests, video-observed meetings and lessons. The issues of bias are discussed in terms of ecological reliability related to Brunnswikís definition of ecological reliability as cues in test measurement terms of theoretical coherence required in science to be cumulative (Hammond, 1998) which can be used to prevent Thorndikeís ëhalo effectí as bias. By studying how theoretical assumptions as guiding principles work in different real-life situations, the measuring of what is meant to be measured can be clarified to strengthen the validity and prevent bias.

Ethical issues using videos when doing educational research

Video analysis,Mentoring in teacher education,Pre-service teacher education,Synergies between learning, teaching and research,Teacher professional development

Susanne Pind-Rossnagl, University Teacher College Lower Austria, Austria;

Working with lesson studies or learning studies also implements the use of videos. But yet, there is little research about how the participants of lesson studies or learning studies are aware of ethical issues using such videos. In order to find out about that, a questionnaire was created, asking 29 mentors-in-training, who have done lesson studies and learning studies during their postgraduate studies in the school year 2013/14 with colleagues, who are members of these studies, too. The aim of this study is to find out, in what way they were aware of ethical issues using videos in their lesson studies or learning studies and at the same time, making them aware of considering these aspects when working with videos again. It is essential, that they are aware of this topic, because these mentors-in-training are doing learning studies in professional

learning communities from the beginning of school year 2014/15 over a period of two school years with novice teachers form different schools. 23 mentors-in-training answered the questionnaire, which tried to find out in what way they were aware of ethic aspects (1) in general, (2) before videos were taken and (3) after the presentation of the videos. The results will be the basis of a discussion about the importance of these issues with the mentors-in-training and how they can be respected in future.

Learning study -research in mathematics education providing teachers with new knowledge for practice

Design based research,Teacher professional development,Teaching/instruction,Mathematics

Mona Holmqvist Olander, University of Gothenborg, Sweden; Joakim Torang Magnusson, University of Gothenburg, Sweden; Ulf Ryberg, University of Gothenburg, Sweden; Jenny Svanteson Wester, University of Gothenburg, Sweden;

The aim of this paper is to describe in what way learning study can be used as a research approach by teacher researchers to contribute both to the research community and the teachers work in the classroom in line with Gutierrez & Penuelís (2014) relevance for practice as a criterion for rigor in educational research. To study in what way practice and research can inform each other a qualitative multiple case analyses (Stake, 2006; Yin, 2014) on three teacher researchersí work on the school subject Mathematics has been carried out. The three teachersí work (Magnusson, 2014; Ryberg, 2014; Svanteson-Wester, 2014) has been triangulated across cases (Yin, 2014) to assure the validity of the results. The meta-analysis of the studies has been based on three theses for the degree of Licentiate consisting of data such as video-recorded planning meetings and lessons, and assessments of studentsí learning outcomes. The teacher-researchers worked close with teachers and formulated the research questions in collaboration with the group of participating teachers. This seems to be an important factor in keeping the results relevant for teachersí work at school. Another important finding is how informative the research review was for the design of the lessons in the intervention. Previous research results were used and tested in practice to study to what extent they are valid, which is a rigor criterion for educational research that informs both practice and research.

P 21

29 August 2015 13:45 - 15:15

Room Blue2_D2

Symposium

Motivation

Moving Forward on Achievement Goal Theory: Autonomous and Controlled Reasons Behind the Goals

Keywords: Achievement,Culture,Motivation and emotion,Self-regulation

Sig's: SIG 8 - Motivation and Emotion

Chairperson: Lennia Matos Fernandez, Pontificia Universidad Catolica del Peru, Peru

Organiser: Lennia Matos Fernandez, Pontificia Universidad Catolica del Peru, Peru

Organiser: Maarten Vansteenkiste, Ghent University, Belgium

Discussant: Johnmarshall Reeve, Korea University, Korea, Republic of

It is critical to focus on the aims ("what") of achievement-goals and on the reasons ("why") why learners pursue achievement-goals (Vansteenkiste, Lens, Elliot, Soenens, & Mouratidis, 2014). To conceptualize these underlying reasons, Self-determination Theory (SDT; Deci & Ryan, 2000) is ideally suited given its long tradition in this area. SDT maintains that a person can regulate achievement-goals in a more autonomous or controlled way. Also, social contexts can vary in the extent to which they encourage the adoption of particular achievement-goals as well as the style used to pursue these goals, which impacts on the reasons students have for pursuing the prompted goals. This symposium aims at examining whether both, the type of pursued or induced goal and the reasons underlying the goal, matter in predicting different outcomes. The present studies extends previous work by (a)examining a broad variety of outcomes, including the use of learning-strategies (paper 1 & 2), emotional outcomes (papers 3&4) and achievement (papers 1,3,&4); (b)examining the reasons underlying task-based goals (papers 1 through 3), intrapersonal goals (papers 3&4) and normative goals (papers 1&3); (c)zooming-in on the contextual factors that lead to the adoption and regulation of achievement-goals (papers 2&4); (d)using both cross-sectional (paper 1), longitudinal (papers 2&4) and experimental (paper 3) designs; and (e)addressing these questions in four culturally diverse nations (Peru,Turkey,Israel,Belgium) and across different achievement-oriented contexts (schooling in papers 1 through 3, sports in paper 4). Findings suggest that it is critical to consider the reasons for adopting-pursuing achievement-goals beyond considering the achievement-goals themselves.

Beyond the ìwhatî of achievement goals: The ìwhyî also matters in predicting learning outcomes

Achievement,Goal orientation,Self-regulation,Higher education,Motivation and emotion

Lennia Matos Fernandez, Pontificia Universidad Catolica del Peru, Peru; Maarten Vansteenkiste, Ghent University, Belgium;

Recently, achievement goals have been defined as aims (the ìwhatî), thereby opening the door for the systematic study of reasons (the ìwhyî) underlying achievement goals. Grounded in Self-Determination Theory, we distinguished between autonomous and controlled reasons for pursuing achievement goals. The purpose of the current study among Peruvian university students (N=223) was to examine if these reasons would matter above and beyond the achievement goals themselves in predicting various outcomes associated with different learning

phases (i.e. preparation, learning, and test phase). Hierarchical linear regression analyses provided evidence for the incorporation of these reasons. Overall, above and beyond the contribution of learnersí achievement goals themselves, autonomously regulated achievement goals yielded more beneficial outcomes compared to controlled regulated achievement goals

Task-goals & underlying autonomous and controlling reasons,need satisfaction and learning-strategies

Achievement,Goal orientation,Self-regulation,Higher education,Motivation and emotion

Aikaterini Michou, Bilkent University, Turkey; Burcin Gumus, Bilkent University, Turkey;

In recent studies it has been found that autonomous reasons underlying reasons of different achievement goals account for positive outcomes irrespectively of the goal to which they are tied (e.g., Gaudreau, 2012; Vansteenkiste, Smeets et al., 2010). However, little research had been carried out to investigate the psychological antecedents of the adoption of achievement goals for autonomous or controlling reasons. Moreover, there is no research that examined whether the reasons underlying task-avoidance goals and their underlying reasons either with outcomes or with psychological antecedents. In two studies with university students (N = 226 and N = 178), we investigated whether need satisfaction and need frustration would predict the type of achievement goals students pursue (i.e., task-approach, task-avoidance; ìWhatî) and their reasons for adopting these achievement goals,(ìWhyî). In addition, we investigated the relation of both task goals and the underlying reasons with educational outcomes (i.e., learning strategies). Results from path analysis revealed that need satisfaction related positively to both task goals, whereas it was only positively related with the autonomous reasons for pursuing these goals. In contrast, need frustration was positively related only with task-avoidance goals and with controlling reasons underlying both types of task goals. Finally, learning strategies were in both studies predicted by autonomous reasons and with task-approach goals in Study 1. Study 2 largely replicated the findings of Study 1, thereby additionally showing that autonomous reasons underlying task-approach goals predict an increase in learning strategies. Overall the findings suggest both the quality or type of the achievement and the quality or type of reasons matter in predicting learning strategies.

Achievement goals, autonomy support and their relation to behavioral and emotional outcomes

Achievement,Goal orientation,Self-regulation,Higher education,Motivation and emotion

Moti Benita, Ben-Gurion University of the Negev, Israel;

Recently, a growing body of research has examined the reasons that underlie achievement-goal adoption, the context in which they are adopted and their effect on diverse outcomes (Vansteenkiste, Lens, Elliot, Soenens, & Mouratidis, 2014). Two experimental studies used the 3X2 model of achievement goals (Elliot, Murayama, & Pekrun, 2011) to examine the relative influence of achievement goals and motivational contexts on both behavioral and emotional outcomes. Behavioral outcomes were measured as speed-accuracy tradeoffs. In study one, 193

college students played a computer game and were prompted to adopt an intrapersonal or normative goals in three motivational contexts (autonomy supportive, autonomy suppressive and neutral). In study two, 191 college students performed the same assignment, but adopted task goals or normative goals in the same three contexts. Overall, results indicated that autonomy supportive context serves as a more consistent predictor of better speed-accuracy tradeoff and positive emotions than the induced type of goals. Study two also revealed that only task-goals which were adopted in an autonomy supportive context predicted better speed-accuracy tradeoff than other-goals. Theoretical and practical implications are discussed.

Autonomous Reasons for Intrapersonal Goals and Self Talk on Need Satisfaction, Flow, and Performance

Achievement,Goal orientation,Self-regulation,Higher education,Motivation and emotion

Athanasios Mouratidis, Hacettepe University, Greece; Jochen Delrue, Ghent University, Belgium; Maarten Vansteenkiste, Ghent University, Belgium;

Recently, it has been argued the move beyond studying the ìwhatî of achievement goals as such to additionally examine the autonomous and controlling reasons underlying these goals, as conceived from a Self-Determination Theory framework (Vansteenkiste, Lens, Elliot, Soenens, & Mouratidis, 2014). Meeting this call, the present study focuses on intrapersonal-approach, relative to ñavoidance, goals pursued in a challenging situation ñ an Internationally popular 20km race - and examines whether their pursuit for autonomous and controlling reasons can predict subsequent motivational processes and outcomes. Among 221 marathon athletes, there were N = 111 athletes (63.1% males) who reported intrapersonal-approach goals (i.e., goals focusing on performing than before) as their dominant goal and N = 86 athletes (59.3% males) who prioritized intrapersonal-avoidance goals (i.e., goals focusing on avoiding performing worse than before). Regression analyses showed autonomous reasons underlying both types of goals as assessed one day before the race to predict positively post-race athletesí reports of autonomy and competence need satisfaction, and flow experience. In addition, intrapersonal-approach goals and autonomous reasons predicted better race performance. Interestingly, controlling reasons underlying pursuit of the two goals positively predicted both positive and negative self-talk (i.e., cognitive and motivational strategies aiming to manage oneís moods and thoughts in a constructive or destructive way, respectively) during race. Path analyses revealed that both types of self-talk yielding opposing relations with flow and need satisfaction, which helps to explain the initial null-relation between controlling reasons and outcomes. These findings complement past research and highlight the pervasive links that autonomous reasons underlying achievement goals may carry across type of studied achievement goal, life domain, and outcomes.

P 22

29 August 2015 13:45 - 15:15

Room Cyan_F2

Invited SIG

Culture and education

The Boundary Turn: challenges in researching and theorizing learning and diversity from decolonial p

Keywords: Cultural diversity in school,Culture,E-learning/ Online learning

Sig's: SIG 21 - Learning and Teaching in Culturally Diverse Settings

Chairperson: Sangeeta Bagga-Gupta, University of Orebro, Sweden

Organiser: Alessio Surian, Universita degli Studi di Padova, Italy

Discussant: Colette Daiute, The Graduate Center, CUNY, United States

This SIG 21 Invited Symposium suggests that renewed and alternate positions to discuss what is glossed as (super)diversity, multiculturalism and multilingualism are needed in European spaces of learning and instruction. Issues related to equity and rights continue, at least in European geopolitical spaces, to be addressed in egalitarian philosophical terms. Thus they fail to engage with the recent changed political status in societal spaces. Furthermore newer conceptualizations in the literature of such spaces contribute to a racialized and reductionist discourse that is counter-productive in relation to as well as beyond education. Taking both alternative theorized framings from decolonial positions as well as empirically framed projects, this invited symposium aims to contribute from (i) different geopolitical spaces and (ii) a range of disciplinary vantage points to critically and empirically inform understandings where learning and diversity are center-staged.

Language learners and learning language: Webs-of-understandings in the era of reinforced boundaries

Conversation/ Discourse analysis,Video analysis,Second language acquisition,Culture,Social aspects of learning,Language (Foreign and second)

Sangeeta Bagga-Gupta, University of Orebro, Sweden;

The paper aims are twofold: first, make visible work that individuals and institutions ìdoî in global North and global South. Second, illustrate how analyses across time and geopolitical spaces allows for revisiting ways in which language categories get talked-and-written-into-being and how identity-positions and culture become framed in and through social practices and textual accountings. Taking both a socially oriented perspective and a decolonial framework this contribution juxtaposes data from different ethnographic projects. The analysis builds upon (i) video-recordings of mundane activities, (ii) data-prompted discussions and (iii) archives and policy related to institutions in Sweden and India where individuals have access to a number of language varieties. Findings highlight the incongruence between individuals and institutional accountings in the global North (as opposed to individuals talk and institutional accountings in the global South) as well as the performance of languaging, identity and culture in the global

North ñ i.e. challenging dominating understandings of language, identity and culture generally and the organization of ìspecialî educational support for ìimmigrantî or ìdisabledî individuals. Issues are also raised regarding the ìtechnificationî of language and diversity. Evidence presented questions the simplistic positions and problematic ìwebs-of-understandingsî that frame mono-bi-multilingualism and mono-bi-multiculturalism in the global North. Providing emic understandings of how accountings constitute a core dimension of ìcollective rememberingî of ìimagined communitiesî, the paper illustrates ìalternative voicesî in Language and Educational Sciences. This endeavor calls for shift in analytical perspectives, a viewing from decolonial positions, instead of dominant colonial viewings built upon northern hegemonies - currently framing discourses of globalization

Understandings languaging and language learning through marginalised communication practice

Qualitative methods,Second language acquisition,Culture,Higher education

Elina Tapio, University of Jyvaskyla, Finland;

This presentation starts by discussing the way semiotic resources and practices, i.e. social actions with a history, used by sign language signers in visually-oriented communities, as well as the research in such domains, have been marginalised. The paper suggests, through practical examples, how we could enrich our views on languaging and language learning by recognising communication-practices inside these visually-oriented domains. The paper draws on ethnographic data collected from an academic English course for university students in a Finnish university. The analysis focuses on the use of gaze, as well as on actions of remodalisation (i.e. resemiotisation on levels of situated practices), and the chaining of modes, in particular. The project resides in the multimodal approach stemming from mediated discourse analysis (Norris 2004, Scollon & Scollon 2004)óand in research into interaction arising from conversation analysis and social semiotics (e.g. Van Leeuwen 2005, Goodwin 2000).

ìWe are doing Distanskurs!î: (Re)thinking the ìdistanceî in online language education encounters

Qualitative methods,Educational technology,Second language acquisition,Culture

Giulia Messina Dahlberg, Dalarna University, Sweden; Sangeeta Bagga-Gupta, University of Orebro, Sweden;

As Technology Mediated Communication increasingly becomes a dimension of everyday life across the globe, individuals have access to alternative ways of engaging in learning practices on-the-go. Learning becomes participation in distributed networks of relationships across geopolitical and virtual spaces. Our study draws upon an anthropologically framed project at the CCD research group in Sweden, where data includes approximately 80 hours screen recordings of online sessions of an Italian for Beginners course offered by a Swedish university as well as national policy documents related to ìdistance educationî (2000-present) in the geopolitical space of Sweden. Sociocultural and postcolonial framings are deployed with the aim of i) examining

the languaging ëin situí when the shared space(s) of the virtual classroom include a range of practices that occur at the boundaries of different online communities and multimodal languaging, and ii) investigating the relationship between the openness and parallel closure of online glocal spaces. Mobility questions conventional conceptions of language wherein ideal communities of speakers are located in ëaí physical space where the learning object, a target language is supposed to be used. Attending to the fallacy of thinking in terms of fieldwork in static geopolitical-linguistic spaces and communities, our analysis shows that mobility of learning on-the-go dismantles dichotomies like real-virtual, f2f-technology mediated, highlighting a nexus-like perspective. Dismantling notions of one nation-one language, facilitated by emerging media practices, it is suggested, also challenges dominant language ideologies based on monolingual-monomodal communication.

Addressing the decolonial and boundary turn in transformative learning

Action research,Qualitative methods,Culture,Interdisciplinary,Out-of-school learning,Knowledge creation

Alessio Surian, Universita degli Studi di Padova, Italy;

The paper brings together my own empirical research with a review and a discussion of the ìdecolonial turnî in social sciences and education (Fanon, 1984; Mignolo, 2009; Walsh, 2013). In presenting empirical research I will focus on experiences of knowledge co-construnction involving (a) housing rights social movements in Buenos Aires (Argentina, in collaboration with the Federacion de Villas, FEDEVI, movement), and (b) immigrant construction workers in Padova (Italy) who participate in the Fillea union (Freirean) cultural circles. Both experiences are framed as action-research projects focusing on the collective production of knowledge (Mercer, 2000; Bialakowski, 2014). Such knowledge is rooted in sharing inhabitants and/or workersí everydayís experiences and in identifying joint claims concerning rights issues.

Q 1

29 August 2015 15:45 - 17:15

Room Green_A1

Paper Presentation

At-risk students

At-risk students

Keywords: Phenomenography,Qualitative methods,At-risk students,Secondary education,Quantitative methods,Cultural diversity in school,Reading comprehension,Primary education,Multicultural education,Problem solving,Mathematics,Motivation and emotion,Experimental studies,Special education,Learning and developmental difficulties,Learning disabilities

Sig's: SIG 15 - Special Educational Needs,SIG 18 - Educational Effectiveness,SIG 8 - Motivation and Emotion,SIG 9 - Phenomenography and Variation Theory

Chairperson: Lisa Dewulf, Ghent University, Belgium

Understanding dropout mechanisms of students at the lower level of secondary education in Costa Rica

Phenomenography,Qualitative methods,At-risk students,Secondary education

Alberto Nagle Cajes, Universidad ORT-Uruguay, Uruguay;

The aim of the paper is to focuses on the study of mechanisms of school disengagement of students at the lowest level of secondary education (7th through 9th grade) in Costa Rica. The idea is to understand how drop-out students perceive the importance of education for their lives. This is actually the major theoretical shortcoming in the research field. The problem is widespread both in Western Europe, Latin America and USA. However the study and analysis of the perspective of the students is not focused in the mainstream of the academic research. The methodological approach to the research of studentís conceptions of studying at the lower level of secondary education is qualitative. The study ascribes to the phenomenographic approach. The findings of the research of are the following typology: a) School as an irrelevant phenomena for the student life, b) School dropout as a consequence of bad teaching, c) School drop-out as a result of irrelevant curriculum design, d) School disengagement as a clash between the culture of the family and the culture of the school, e) School as an irrelevant issue for the group of peers, f) School disengagement as a failure of the socialization mechanisms. The paper also sheds some light on the conceptions of dropping students to studying at the lower level of secondary education. The paper generate relevant knowledge for dropout prevention.

Segregated primary classes and reading comprehension: a multilevel repeated measures examination

Quantitative methods,Cultural diversity in school,At-risk students,Reading comprehension,Primary education,Multicultural education

Lisa Dewulf, Ghent University, Belgium; Johan van Braak, Ghent University, Belgium; Mieke Van Houtte, Ghent University, Belgium;

In this study we want to gain insight in the possible causes of low academic achievement of pupils from ethnic minorities in socially and ethnically segregated primary schools in Flanders (Belgium). We examine how both student and class level characteristics relate to learning gain in reading comprehension. The results of a three-level multivariate repeated measures analysis of data from 419 students in 31 segregated second grade classes in Flanders, during two measurement occasions, indicate differences between classes and students in learning gain on reading comprehension. At the student level, the highest educational level of the mother plays an important role, next to gender and deductive reasoning skills. Students with a low-educated mother have an unfavorable initial score for reading comprehension. But having a low-educated

mother has no significant impact on the learning gain for reading comprehension. The same pattern is seen for deductive reasoning skills. Differences in the initial score were not related with gender, but being a girl was found to affect the growth in reading comprehension positively. At classroom level a more ethnic diverse class setting is positively related with learning gain. Most importantly, teacherís trust in students was found to be the key factor related to the growth in reading comprehension. The educational significance of the research is discussed.

Characterising non-engagement in algebra and identifying students at-risk

Quantitative methods,Problem solving,Mathematics,Secondary education,Motivation and emotion

Kelly Trezise, University of Melbourne, Australia; Robert Reeve, University of Melbourne, Australia;

Anecdotal evidence suggests that some adolescent students simply stop trying to solve math problem. Is it possible to identify the characteristics of those students who may be at risk of such non-engagement behaviours? We investigated this issue by examining the performance of 152 14-year-oldsí as they studied for an algebra exam. Of particular interest were those students who solved problems ìtooî quickly and made many errors. Participants completed an algebraic dual span task, comprising algebraic appraisal and cognitive load components, five times in two math classes over a single day. Working memory and algebraic worry were also assessed. Data were analysed using a mover-stayer latent transition analysis that identified five accuracy/response time profiles. Students initially belonging to subgroups that took a long time to solve problems were likely to transition, over time, to subgroups with very fast response times and high errors, suggesting they had ìstopped tryingî and solved problem too quickly. Of particular interest is that differences in working memory capacity and anxiety/worry predicted subgroup membership and changes. These findings suggest that it is possible to identify the profiles of students who may be at risk of non-engagement in math problem solving.

Making the right connections: Helping at-risk second graders improve their fluency and comprehension

Experimental studies,Quantitative methods,Special education,At-risk students,Learning and developmental difficulties,Learning disabilities

Lefki Kourea, University of North Carolina - Charlotte, United States; Eleni Vakana, European University Cyprus, Cyprus;

This study reports the findings of an experimental single-subject research investigation on the effects of a reading program on the fluency and comprehension of at-risk elementary-aged learners. Specifically, this investigation focuses on improving the reading fluency and comprehension skills of six at-risk second-grade students. A quantitative experimental single-subject study was conducted to examine the effectiveness of an explicit reading instruction, incorporating a strategy instruction and repeated readings. Research main findings showed a clear functional relationship between repeated readings and student fluency. Comprehension

outcomes in inferential questioning were strengthened and increased during the implementation of strategy instruction. Implications for practice and study limitations will be discussed.

Q 2

29 August 2015 15:45 - 17:15

Room Green_A2

Paper Presentation

Attitudes and beliefs

Attitudes and beliefs

Keywords: Quantitative methods,Student learning,Attitudes and beliefs,Secondary education,Case studies,Instructional design,School effectiveness,Interdisciplinary,Special education,Experimental studies,Reading comprehension,Higher education

Sig's: SIG 15 - Special Educational Needs,SIG 18 - Educational Effectiveness,SIG 2 - Comprehension of Text and Graphics

Chairperson: Christoph Niepel, University of Luxembourg, Luxembourg

Reading for pleasure in Greece: An Exploration of the PISA Results

Quantitative methods,Student learning,Attitudes and beliefs,Secondary education

Karolina Retali, Hellenic Open University, Greece; Vassilia Hatzinikita, Hellenic Open University, Greece;

Studies in the field of reading literacy indicate a positive link between reading for pleasure and reading achievement at school. In addition, research from OECD (2002) showed that reading for pleasure can be more important for students' academic success than their familyís socio-economic status. However, research suggests that a growing number of children do not read for pleasure. Therefore, the present study, with the use of multilevel modelling analysis of the PISA 2009 database, looked at the reading for pleasure habits of 15-year-old students in Greece and whether they are related to various factors such as reading achievement, gender, socioeconomic status and immigrant background. Significant associations have been identified, with reading achievement being strongly linked to reading for pleasure. Greece is a country with a below-average reading achievement in all PISA assessment cycles and therefore it is deemed important to examine factors indicated by the literature to be associated with reading achievement. Besides, there is very limited large-scale research available in Greece related to students' attitudes towards reading.

How do student and classroom characteristics affect students' attitude toward mathematics?

Case studies,Instructional design,School effectiveness,Attitudes and beliefs,Interdisciplinary,Secondary education

Henry Kiwanuka, KU Leuven, Belgium; Gudrun Vanlaar, KU Leuven, Belgium; Chandra Reynolds, University of California, Riverside, United States; Speranza Namusisi, Uganda Martyrs University, Uganda; Jan Van Damme, KU Leuven, Belgium;

The current study investigates effects of the student and classroom characteristics on three components of attitude toward math (ATM): math self-confidence, usefulness and enjoyment of math. The sample consists of 4819 first-year secondary school students (grade 7, about 14-15 years old) from 78 classes of 49 schools in central Uganda. Data collection for the study was carried out through an attitude questionnaire administered at the beginning and at the end of school-year 2012. Three-level random intercept regression modeling was used to analyze the questionnaire responses. The results indicate that, for each of the three components, out of the total variance, between student, between class and between school differences ranged from 86% to 91%, 2.0% to 2.7%, and 3.5% to 9.1%, respectively. At the student level, prior math achievement and parental beliefs and attitudes were significant predictors of each of the three components. At the classroom level, classroom assessment was significantly associated with math self-confidence, teacher beliefs and attitudes with usefulness, and teaching style and teacher's behavior with enjoyment of math. Implications for the findings and directions of further research are discussed in the paper. Keywords: Math self-confidence , Usefulness of math, Enjoyment of math, secondary school students

The relations between social competence and childrenís attitudes towards peers with special needs

Quantitative methods,Special education,Attitudes and beliefs,Secondary education

Maria Teresa Goncalves, Polytechnic Institute of Viana do Castelo, Portugal; Marina Lemos, University of Porto, Portugal;

The movement towards inclusive education has led to an increasing interest on the research on attitudes of typically developing students towards their peers with special needs. Attitudes of others are considered as environmental factors impacting on the resulting individualsí functioning or disability. Research has evidenced that attitudes towards peers with special needs play a crucial role in facilitating or hindering their inclusion in society and in educational contexts. The aim of the present study is to analyse attitudes (behavioral-affective and cognitive dimensions) towards peers with special needs as part of studentsí social competence, through examining their relations with social motivation, perceived competence and prosocial behavior. Participants were students from 7th to 9th grade (N=225). Preliminary analysis showed that affective-behavioral attitudes towards peers with special needs were higher in girls than in boys and in students who report having contact with peers with disabilities. Affective-behavioral attitudes showed moderate correlations with social motivation while cognitive attitudes were not

related. The relations found between attitudes and social motivation (and more specifically with prosocial goals) may indicate that these attitudes are closer to friendship building than to conformity with social rules. Structural equation modelling will be conducted to further analyse the relations among the social competence variables. Findings have implications for planning educational interventions to promote positive attitudes and acceptance of peers with disabilities.

How Prior Attitudes Bias Evaluation on the Web

Experimental studies,Student learning,Attitudes and beliefs,Reading comprehension,Higher education

Johan van Strien, Open University of the Netherlands, Netherlands; Yvonne Kammerer, Knowledge Media Research Center, Germany; Saskia Brand-Gruwel, Open University, Netherlands; Els Boshuizen, Open University, Netherlands;

In this study we examined the influence of prior attitude strength on the evaluation of sources and information on the Web. Seventy-nine German university students participated in an eye-tracking study in which they read information from eight pre-selected websites of varying credibility on the controversial topic of organic foods. Results showed that participants with strong prior attitudes appeared to allocate an equal amount of attention to attitude-inconsistent as to attitude-consistent information. In line with expectations, participants with strong prior attitudes allocated more visual attention to logos from attitude-consistent sites than to logos from attitude-inconsistent sites. Participants with strong prior attitudes gave higher credibility ratings to attitude-consistent websites than to attitude-inconsistent ones. In their essays they included more arguments from attitude-consistent websites than from attitude-inconsistent ones. In sum, students are generally not biased during processing of attitude-inconsistent information, but that they are when evaluating the information and presenting it in an essay task.

Q 3

29 August 2015 15:45 - 17:15

Room Yellow_G3

Paper Presentation

Cognitive development

Cognitive development

Keywords: Content analysis,Cognitive skills,Literacy,Language (L1/Standard Language),Primary education,Knowledge creation,Quantitative methods,Assessment methods and tools,Cognitive development,Mathematics,Problem-based learning,Student learning,Reasoning,Science education,Mixed-method research,Problem solving

Sig's: SIG 12 - Writing,SIG 17 - Qualitative and Quantitative Approaches to Learning and Instruction,SIG 22 - Neuroscience and Education,SIG 3 - Conceptual Change

Chairperson: Claudia Ventura, Universidade Nova de Lisboa, Portugal

The Voice of Holland: Voicing probability in written Dutch past tense inflection

Content analysis,Cognitive skills,Literacy,Language (L1/Standard Language),Primary education,Knowledge creation

Sanne van der Ven, Utrecht University, Netherlands; Elise De Bree, University of Amsterdam, Netherlands; Han L.J. van der Maas, UvA, Netherlands;

Learning to spell properly is a protracted process for children in many languages. In Dutch, one area of difficulty is past tense inflection. Regular past tenses are formed by adding either allomorph ñde or ñte to a verb stem, e.g. werkte (worked) or speelde (played). Verb stems ending in a sound that is voiceless (e.g. k) take ñte, whereas those ending in a voiced sound (e.g. l) take ñde. Although children are taught a rule to inflect correctly, they often choose the wrong allomorph. A possible explanation is that childrenís language production is not (exclusively) rule-based but guided by statistical regularities. One such regularity is voicing probability: the likelihood with which a certain sound pattern is followed by a voiced sound such as /d/. If children are sensitive to this regularity, it should aid them in choosing the correct form in verbs consistent with this pattern, but lead them astray in inconsistent verbs. To test this assumption, we investigated the error patterns in 398,202 past tense realizations of primary school children, obtained with a large online language program named Taalzee (Language Sea). We found that voicing probability drove verb inflection. These results suggest that the implicit knowledge that children have is a useful source of information. However, it also leads them astray in some instances. Making this knowledge explicit in education may help children to identify the difficult cases, so they can inflect these verbs correctly too.

Diagnostic relevance of longitudinal change in childrenís 0-100 to 0-1000 number-line error patterns

Quantitative methods,Assessment methods and tools,Cognitive development,Mathematics,Primary education,Problem-based learning

Jacob Paul, University of Melbourne, Australia; Robert Reeve, University of Melbourne, Australia;

Recent research has focused on the ways in which children learn to estimate quantities by assessing the ability to accurately position numerical values along a number-line (NL). Reductions in NL estimation errors across age are consistently associated with improvement in math problem solving accuracy. As such, NL estimation ability has been suggested as a diagnostic indicator for identifying potential math learning difficulties. We test the extent of this claim by: (1) examining the association between NL error signatures and mental calculation accuracy longitudinally, (2) assessing NL error signatures on number ranges relevant for the

stage of learning (0-100 earlier and 0-1000 later), and (3) employing an analytic change model (i.e., a latent difference score model), to overcome difficulties interpreting correlations between two changing measures. NL estimation of 217 7-year-oldsí (test occasion one) was assessed three times over 18 months, along with an arithmetic word problem solving task on the third and one further test occasion. NL estimation accuracy improved over time, predicted changes in accuracy across NL tasks, and predicted future calculation accuracy. Furthermore, the longitudinal prediction of later mental calculation ability from initial 0-100 NL estimation accuracy was mediated by accuracy on the 0-1000 NL task, suggesting a consistency in NL error signatures across number ranges. Our findings support the use of NL estimation as an index of math problem solving and highlight the importance of incorporating information regarding past and present performance in predicting math learning outcomes.

Primary-school scientific thinking: The role of inhibition and understanding recursive mental states

Quantitative methods,Student learning,Cognitive development,Reasoning,Science education,Primary education

Christopher Osterhaus, Freiburg University of Education, Germany; Susanne Koerber, University of Education Freiburg, Germany; Beate Sodian, Ludwig-Maximilians-Universitat (LMU), Germany;

Understanding experimental designs (UNEX) and understanding the Nature of Science (NOS) are key components of scientific thinking that allow students to differentiate a conclusive from a non-conclusive experiment, to appreciate the goals of scientific inquiry, or to understand that science is not a mere gathering of facts but an intentional, cyclic process of knowledge construction. Based on a dual-process account of scientific thinking, this study proposes a developmental model of scientific thinking that suggests that inhibitory control and NOS understanding influence the rise of competencies in UNEX. In turn, childrenís understanding of NOS, the model suggests, is closely related to their conceptual understanding of the recursive nature of mental states. In a sample of 402 primary-school children from grades 2 to 4 this model was tested for its validity by assessing childrenís understanding of NOS and UNEX, their inhibitory control, their understanding of the recursive nature of mental states, and their intelligence and text comprehension. A structural equation model supported the theoretical model, revealing significant relations between UNEX, inhibition and NOS. Childrenís understanding of the recursive nature of mental states was significantly related to NOS but not to UNEX. In sum, our results show that two central competencies of scientific thinking, NOS and UNEX, are closely related. Although this finding supports the idea of a conceptual overlap between the two constructs, the differential influences of distinct cognitive abilities support the validity of separating these competencies on a theoretical level. Implications of the distinct cognitive influences are discussed.

Use of a mixed-method design to study creativity development through Model-Eliciting Activities

Mixed-method research,Student learning,Problem solving,Mathematics,Primary education,Problem-based learning

Miriam Amitt, Ben-Gurion University of the Negev, Israel; Talya Gilatt, Ben-Gurion University of the Negev, Israel;

The focal point of this paper is to present the crucial aspects of applying a realistic mixed-method approach in comprehensive research aimed at exploring the potential implications of model-eliciting activities (MEAs) intervention program on studentsí innovative and creative thinking. The participants in this research were high-ability and mathematically talented primary-school students who were members of ìKidumaticaî math club. To target our focal point we will focus on two central quantitative and qualitative analytical strands of our comprehensive research. The quantitative strand analysis explored the effect of MEAs intervention program based on quantitative results obtained from pre-test and post-test forms of the Figural Torrance Tests of Creative Thinking (TTCT), given to both control and intervention groups. The qualitative strand was aimed at identifying and conceptualizing students' creative thinking involved in the mathematical modeling process in order to provide a more detailed understanding of the quantitative result. Different types of qualitative data, obtained from 12 focal groups of students participating in the MEAs program, were analyzed. Quantitative findings indicated the MEAs' potential to develop and improve studentsí creative and innovative thinking. Qualitative results revealed three core categories of student creative abilitiesóappropriateness, ëmathematical resourcefulnessí and inventiveness. This systematic investigation not only revealed the positive effect of MEAs on students' innovative and creative thinking abilities, it also enabled understanding how these abilities manifest themselves in the creative mathematical modeling process which had been encouraged through MEAs.

Q 4

29 August 2015 15:45 - 17:15

Room Green_A3

Paper Presentation

Collaborative and cooperative learning

Collaborative and cooperative learning and higher education

Keywords: Quantitative methods,Economics of education,Interdisciplinary,Social sciences,Higher education,School effectiveness,Social aspects of learning,Cooperative/collaborative learning,Experimental studies,Educational technology,Peer interaction,Science education,E-learning/ Online learning,Computer-supported collaborative learning,Content analysis,Teacher professional development,Competencies,Communities of practice

Sig's: SIG 4 - Higher Education,SIG 7 - Learning and Instruction with Computers

Chairperson: Essi Vuopala, University of Oulu, Finland

Does the secondary school influences a pupilís choice for bachelor teacher education programmes?

Quantitative methods,Economics of education,Interdisciplinary,Social sciences,Higher education

Mike Smet, KU Leuven, Belgium;

In recent years, concerns have risen regarding the Flemish teacher labour market : there is a fear of a decreasing quality of inflowing students in teacher education programmes. In this paper we investigate the transition from secondary school to higher education in Flanders, more specifically to professional teacher education programms (i.e. Bacherlor in Education). We used merged administrative databases from the Flemish Department of Education in order to construct a longitudinal dataset, enabling to track individual students from secondary to higher education. We obtained data from the entire population of secondary school leavers in the academic year 2004-2005. These data allow tracking individual students during their higher education career from the academic year 2005-2006 until 2011-2012. The data include individual demographic student characteristics, individual enrolment information in secondary and higher education and a number of secondary school characteristics. Since pupils are nested in schools and in municipalities multilevel estimation techniques were used to model the transition from secondary education to various potential higher education programmes. Both random intercepts and random slopes models were estimated. Our findings show that the odds of enrolment in teacher education programs are highly influenced by several individual, secondary school and regional characteristics. While the differences with academic bachelors have been found to be more pronounced when considering most of the determinants, the inflow in teacher education was also found to be substantially different from the inflow in other professional programs. However, not all variance that is detected at the level of secondary schools can be explained by secondary school characteristics.

Changes in teacher educatorsí perceptions of collaborative learning

Quantitative methods,School effectiveness,Social aspects of learning,Interdisciplinary,Higher education,Cooperative/collaborative learning

Henderijn Heldens, Eindhoven University of Technology , Netherlands; Perry den Brok, Eindhoven University of Technology, Netherlands; Anouke Bakx, Fontys PABO Eindhoven, lectoraat L&I., Netherlands;

Collaborative learning is an important factor for innovation in (higher)education. In this study teacher educatorsí perceived collaborative learning is studied from a cognitive as well as a social perspective in order to obtain a comprehensive view of collaborative learning at work in higher education. A large-scale educational innovation in teacher education institutes in the Netherlands was used as a context for this study. Teacher educators in three subject departments participated in the research, mathematics, Dutch language and environmental science. Growth curve modelling was used to analyse the development of teacher educatorsí perceived collaborative

learning regarding the two dimensions. Data were collected during the first two years of the implementation of this innovation in one particular teacher education institute in the Netherlands. Results showed changes in teacher educatorsí perceived collaborative learning (quadratic change rate ñ e.g. decrease-increase - in the cognitive dimension and cubic change rate ñ e.g. decrease-increase-decrease- in the social dimension) and also differences between individual teacher educators. Cognitive and geographical proximity and also a teacher educatorsí position in the network (centrality) contributed positively to these individual differences in collaborative learning.

Critiquing Knowledge Awareness: Is knowledge best shared or given to individuals?

Experimental studies,Educational technology,Peer interaction,Science education,E-learning/ Online learning,Computer-supported collaborative learning

Michail Kozlov, Knowledge Media Research Center, Germany; Juergen Buder, Knowledge Media Reserch Center, Germany;

The increasing complexity of tasks the modern workforce is faced with, frequently requiring collaboration, has led to an increase in research into effective ways of sharing and exchanging knowledge. In this domain the Knowledge and Information Awareneness approach has shown itself to be a reliable way of increasing the efficiency of ad hoc online groups, by providing group members with insight into their collaborative partnersí knowledge base at the outset of a collaboration. The present study aimed to further validate the paradigm by contrasting performance of groups with insight into their partnerís knowledge against groups without such insight and, novelly, nominal groups in which individuals had access to the entirety of the groupís knowledge. Task solving efficiency, and long term retention of the study material were measured. Contrary to expectations, individuals in the Nominal Group condition were fastest at solving the study task while retaining the same amount of the studied material as groups who were genuinely collaborating. This finding hints that the actual benefit of having insight into the collaboration partnersí knowledge base at the outset might lie in individual group members being able access the entirety of their groupís knowledge early on.

Excellent university teachersí pedagogical practices within the significant scholarly communities

Content analysis,Teacher professional development,Competencies,Higher education,Communities of practice

Auli Toom, University of Helsinki, Finland; Hanni Muukkonen, University of Helsinki, Finland; Viivi Virtanen, University of Helsinki, Finland; Mirja Ruohoniemi, University of Helsinki, Finland; Nina Katajavuori, University of Helsinki, Finland;

Scholarship of teaching has been defined as a key capability of teachers required in high quality university teaching. Scholarship of teaching contributes to increased awareness of the relationship between learning and instruction, development of pedagogical practices in university learning and instruction, student engagement (Trigwell et al., 1999; Kreber, 2002; Baeten et al.,

2010), and studentsí competences developed while studying (Lindblom-Ylanne et al., 2003). Scholarship of teaching is realized in the pedagogical conceptions and especially in the manifold pedagogical practices of university teachers. Still, we know surprisingly little about the advanced pedagogical practices of champion university teachers in various disciplines. This study explores the pedagogical practices that the scholarly university teachers report to utilize and considers the various pedagogical communities enabling these practices. The extensive teaching portfolio data from 116 applicants to the teachersí academy for university teaching and research staff were qualitatively content analysed following an abductive strategy. Results showed that scholarly teachers employ individual, interactional and deeply collaborative practices in their teaching. University teachers reported primarily dialogical practices with students and close colleagues. In addition, the results further showed that highly collaborative pedagogical practices between teachers and with students as well evolve in research-intensive contexts when teaching with research collaborators. These show the close relationship between research and teaching as well as the need to cultivate the scholarship of teaching and learning at university even further.

Q 5

29 August 2015 15:45 - 17:15

Room Green_A4

Paper Presentation

Comprehension of text and graphics

Comprehension of text and graphics

Keywords: Quantitative methods,Cognitive skills,Literacy,Reading comprehension,Experimental studies,Educational technology,Comprehension of text and graphics,Higher education,Learning in context,Instructional design,Interdisciplinary,Action research

Sig's: SIG 2 - Comprehension of Text and Graphics

Chairperson: Emmanuel Manalo, Kyoto University, Japan

Examining the consistency of studentsí source evaluations throughout the multiple source use process

Quantitative methods,Cognitive skills,Literacy,Reading comprehension

Patricia A. Alexander, University of Maryland, United States;

Students were asked to research a contemporary political issue using a library of six sources, varying in source type and reliability (e.g., analysis essay, newspaper, Wikipedia). When accessing any source in the library, students were asked to rate its usefulness, trustworthiness, and interestingness. Evaluations were compared depending on whether a particular source was

accessed early, in the middle, or toward the end of studentsí research process. Additionally, we examined the extent to which evaluations of a source differed according to the texts that students accessed before it. Indeed, evaluations of the same source were found to differ depending on when, during the source use process, the particular text was accessed and on the other sources used. For instance, low reliability texts were rated as significantly less trustworthy when accessed later in studentsí multiple source use process and when used following accessing of a high reliability source. Evidence suggests that in multiple source contexts, studentsí source evaluations may be referential and comparative rather than absolute.

Extracting pertinent and useful spatial information from an animation of a 3D anatomical structure

Experimental studies,Educational technology,Comprehension of text and graphics,Higher education,Learning in context

Sandra Berney, University of Geneva, Switzerland; Jonathan Groff, Universite de Bourgogne / Lead - CNRS, France; Mireille Betrancourt, University of Geneva, Switzerland; Jean-Michel Boucheix, University of Dijon, LEAD-CNRS, France;

Functional anatomy is a spatially complex instructional domain that requires learners to mentally manipulate the anatomical structure to imagine its spatial orientation. Involving spatial reasoning and mental imagery, these mental transformations are challenged by the need to take into account the 3D body space. The experimental pilot study reported here was conducted to explore the role of visuo-spatial ability when processing an animation with a 3D rotating model (3D animation) as well as performing spatial task. Eye-tracking data were collected with 10 psychology students. Associations were found between time spent in AOIs of the scapula and mental rotation ability. Albeit less pronounced, a similar trend was found for the perspective-taking ability. Preliminary analysis of the verbal reporting during the learning phase revealed trends in two distinct strategies.

Free recall as a strategy for text learning: A test of its practical benefits

Experimental studies,Instructional design,Comprehension of text and graphics,Interdisciplinary,Higher education

Huib Tabbers, Erasmus University Rotterdam, Netherlands; Mario de Jonge, Erasmus University Rotterdam, Netherlands; Maria Alozai, Erasmus University Rotterdam, Netherlands;

Retrieval practice is being advocated as a powerful strategy for long-term retention of what people have learned. In this study, we looked at the practical value of this strategy for text learning, by investigating whether retrieval practice also has a benefit for learning if the final test is not identical to the test used for retrieval practice. We set up an experiment in which participants had to read two short study texts and made a free recall test on one text and reread the other text. Subsequently, half of the participants received a multiple-choice test about the main concepts of the text, whereas the other half received the test one week later. For both retention intervals, performance was better for the text that had been restudied. So we were

unable to replicate the benefit of free recall as a strategy for the long-term retention of text information with a multiple-choice test as final test. This finding raises questions about the practical value of retrieval practice for text learning in a more realistic educational setting.

A pictogram is better than thousand words?

Action research,Experimental studies,Educational technology,Instructional design,Comprehension of text and graphics

Jonathan Groff, Universite de Bourgogne / Lead - CNRS, France; Jean-Michel Boucheix, University of Dijon, LEAD-CNRS, France; Sandra Berney, University of Geneva, Switzerland;

There is a proverb which says that ´ A picture is worth a thousand words ª. Yet graphic representations could illustrate specific concepts with minimal ambiguity. This is the case of pictograms. In everyday life, single static pictograms are widely (and efficiently) used in different domains such as traffic and road signs, public areas, humanñmachine interfaces, industrial areas (for safety purposes), and healthcare centers. This study analyzes comprehension of different categories of pictographic representations on railway traffic disruptions presented via two graphic formats (animated or static). Sixty-five participants were asked to understand a series of sixteen pictograms as soon as possible. Results showed that the most ´ familiar ª and the most ´ typical ª representations lead to better comprehension scores. Furthermore pictograms are understood more quickly in static format than in animated format.

Q 6

29 August 2015 15:45 - 17:15

Room Orange_E1

Paper Presentation

Early childhood education

Early childhood education

Keywords: Experimental studies,Second language acquisition,Cognitive skills,Interdisciplinary,Early childhood education,Game-based learning,Mixed-method research,Literacy,Parental involvement in learning,Language (L1/Standard Language),Lifelong learning,Student learning,Self-regulation,Motivation and emotion,Emotion and affect,Emotion and cognition,Social development,Social interaction,Primary education

Sig's: SIG 18 - Educational Effectiveness,SIG 5 - Learning and Development in Early Childhood

Chairperson: Athanasios Gregoriadis, Aristotle University of Thessaloniki, Greece

Childrenís Vocabulary Learning by Embodying Words Through Physical Activity and Gesturing

Experimental studies,Second language acquisition,Cognitive skills,Interdisciplinary,Early childhood education,Game-based learning

Konstantina Toumpaniari, Institute of Psychology, Erasmus University Rotterdam, Netherlands; Sofie Loyens, University College Roosevelt, Netherlands; Myrto-Foteini Mavilidi, University of Wollongong, Australia; Fred Paas, Erasmus University Rotterdam/University of Wollongong, Netherlands;

Research has demonstrated that physical activity involving gross motor movements can lead to better cognitive functioning and higher academic achievement scores. In addition, research within the theoretical framework of embodied cognition has shown that embodying knowledge through the use of more subtle movements, such as task-relevant gestures, has a positive effect on learning. In this study we investigated the combined effects of physical activity and gesturing on learning. The effects of a four-week intervention program, in which 67 preschool children embodied words through physical activities and gestures, on foreign-language vocabulary learning were investigated. The main hypothesis that learning by embodying words through physical activities and gestures would be perceived as the preferred teaching method and lead to higher learning outcomes than learning by embodying words through gestures only, and learning without physical activities or gestures was confirmed by the results. The results of this study hold great promise for instructional methods combining physical activities and gestures as enhancers of childrenís learning.

The Social Practice of Joint Storybook Reading - What do Serbian Parents Actually do?

Mixed-method research,Literacy,Parental involvement in learning,Language (L1/Standard Language),Early childhood education,Lifelong learning

Jelena Radisic, Institute for Educational Research (Belgrade), Serbia; Nada Seva, Institute for Educational Research, Serbia;

Relying on the concept of emergent literacy and the importance of the home literacy environment (HLE) plays in its development, the paper focuses on the social practice of joint storybook reading in families with children age 3 to 5. Study employs a sequential mixed methods research design. Qualitative phase included videotaping with twelve families participating in the study involving three different age groups (age 3, 4 and 5), controlled also for child's gender and presented reading content. In addition parents answered a questionnaire comprised of adapted Parental Literacy Practices Inventory and Parent Reading Belief Inventory ñ PRBI. Data concerning family demographic characteristics and information about the childís emergent literacy activities at home was gathered. Analysis suggests two distinctive set of parents practices. The first is characterized by parents using child adjusted language, more freely and regularly leave the boundaries of the story line and provide opportunities for the child to solicit predictions, explore own interests and create opportunities for substantial meaning making to take place as part of the child-parent interaction. The second is characterized by actions

focusing on the reading activity as an oral production of the words depicting the story. Results are analysed in the context of cross-cultural differences in HLE, previous reports and their relevance to current education policy in the pre-school system.

Effects of Nature Pictures on Preschool Childrenís Self-Control Strength

Experimental studies,Student learning,Self-regulation,Interdisciplinary,Early childhood education,Motivation and emotion

Catherine Gunzenhauser, Leipzig University, Germany; Frank Wieber, University of Konstanz, Germany; Antje von Suchodoletz, New York University Abu Dhabi, United Arab Emirates;

Exerting self-control is crucial for childrenís academic achievement from preschool age onwards. However, self-control strength is susceptible to depletion effects. It has been suggested that interacting with nature might help conserve self-control resources. Specifically, attention restoration theory proposed that the beneficent effect of nature on self-control is due to soft fascination (effortless occupation of attention). Aims of the present study were (1) to examine possible favorable effects of nature on self-control in preschool children and (2) to investigate the role of soft fascination in the beneficent effects of nature. Participants were N = 84 preschoolers (44% girls, Mean Age = 5.71 years) that were randomly assigned to one of four experimental conditions: nature only, urban only, nature with soft fascination objects and urban with soft fascination objects. After completing a depleting task, children watched pictures specific to each experimental condition on a laptop screen. Additionally, children rated their subjectively perceived soft fascination with the pictures. As an outcome measure of self-control, children were asked to choose to proceed with working on either an easy or a challenging task. As expected, watching nature pictures significantly and positively predicted childrenís self-control. However, there were no significant effects of experimentally manipulated or subjectively perceived soft fascination on childrenís self-control. This study is among the first to support beneficent effects of nature on self-control in preschool children. However, there was no evidence for the suggestion that nature affects childrenís self-control by exerting soft fascination. Theoretical and practical implications will be discussed.

Improving social and emotional development of primary school pupils

Experimental studies,Emotion and affect,Emotion and cognition,Social development,Social interaction,Primary education

Daniel Muijs, University of Southampton, United Kingdom;

This paper reports on the results of an intervention to improve the social and emotional skills of primary school age children and to build their resilience and empathy, resulting in more positive social interactions. The programme is based on principles of social and emotional learning, teaching thinking skills and gamification, and consists of ten discreet activities which encourage reflection through collaborative group work, prompted by a scenario depicted through a cartoon. The programme was run in in three local authorities in England between January and July 2014. The final sample consisted of 16 schools, 42 teachers and 1218 pupils. The programme was run

in year 1 and year 5 of primary school. A quasi-experimental design was used to study the impact of the programme. The 16 schools were randomly divided into two groups, with schools in group 1 receiving the intervention in the first ten weeks of the programme, and schools in group 2 receiving the intervention during the following ten weeks. Schools in group 2 therefore acted as a comparison group for schools in group 1. Three main measures were used to measure impact: the Child Behaviour Scale, a measure of childrenís aggressive, pro-social, or withdrawn behaviour; the SEED-AS, a measure of pupilsí personal and self-development, emotional literacy, empathy and tolerance, assertiveness and communication, and conflict management skills; and a peer nomination instrument. Fidelity of implementation measures were also used.

Q 7

29 August 2015 15:45 - 17:15

Room Green_A6

Paper Presentation

Early childhood education

Early childhood education

Keywords: Action research,Case studies,Conversation/ Discourse analysis,Design based research,Mixed-method research,At-risk students,Metacognition,Self-regulation,Social interaction,Early childhood education,Quantitative methods,Special education,Learning disabilities,Writing/Literacy,Primary education,Experimental studies,Student learning,Learning in context

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 16 - Metacognition,SIG 5 - Learning and Development in Early Childhood

Chairperson: Vasilis Grammatikopoulos, University of Crete, Greece

From conceptual clouds to local wiki: teachersí knowledge blending in day nurseries counselling

Action research,Case studies,Conversation/ Discourse analysis,Design based research

Fabio Dovigo, Bergamo University, Italy;

The paper investigates the role of tacit and explicit knowledge as a means to promote parental empowerment in day nurseries. Helping parents to develop the ability to feel competent in the daily decisions concerning the child is a crucial task for day nurseries teachers. The research aimed to analyze the communication between parents and teachers, examining the different types of learning (formal or informal) and knowledge (explicit or tacit) teachers use in counseling parents. Understanding how teachers manage this store of knowledge can enable them to acquire

a reflective stance as a way of improving their ability in promoting parentsí empowerment. To support parents, teachers develop skills based on different kinds of knowledge, a particular ìblendî ñ consisting of formal learning and personal experience, commonsense or lessons learned ìin the fieldî - which refers to a set of variously elaborated educational paradigms on early childhood. Analyzing this combination of knowledge allows them to identify the "epistemological compass" adopted by teachers in supporting parents in terms od educational guidelines, and to evaluate it as a contribution to the development of more reflective professional practices.

A Dynamic Assessment (DA) Intervention for Facilitating Metacognitive Processing in Preschoolers

Mixed-method research,At-risk students,Metacognition,Self-regulation,Social interaction,Early childhood education

Loren Marulis, Connecticut College, United States; Annemarie Palincsar, University of Michigan, United States;

This study focused on examining whether a Dynamic Assessment (DA) intervention would enhance the metacognitive skills of preschool-aged children and whether their metacognitive skills would predict their cognitive and pre-academic skills. Eighty-three diverse preschoolers (Mage=53.47 months, SD=4.53; 41% female) were randomly assigned (stratified/balanced random assignment across a low-income/Head start preschool and Tuition-based middle to high income preschool) to an intervention or comparison group to assess the facilitation of metacognitive processes. Childrenís cognitive (memory and problem-solving), pre-academic (math, and reading), and metacognitive skills were assessed before and after participating in a DA intervention (or repeated exposure session). Children in the DA obtained significant gains on both cognitive and metacognitive skills whereas children in the comparison condition did not. Mediated/explicit instruction (within the DA) seemed to be most effective at facilitating metacognitive processes. Childrenís metacognitive skills were positively related to cognitive development and pre-academic functioning in language arts, mathematics, problem solving, and memory. Individual differences in metacognitive skills predicted childrenís pre-academic functioning in language arts and mathematics. Children at risk for learning difficulties who had higher metacognitive skills also had higher cognitive and pre-academic skills indicating that metacognition may serve as a protective factor.

The Early Risk Factors of RD and Teachers Assessing Studentsí Early Reading Performance

Quantitative methods,Special education,At-risk students,Learning disabilities,Writing/Literacy,Primary education

Riitta Virinkoski, University of Jyvaskyla, Finland; Mikko Aro, University of Jyvaskyla, Finland; Marja-Kristiina Lerkkanen, University of Jyvaskyla, Finland; Kenneth Eklund, University of Jyvaskyla, Finland; Leena Holopainen, University of Eastern Finland, Finland;

The aims of the present study were to examine what methods the first grade teachers use in the assessment of pre-reading skills and reading performance, and how accurately the teachersí ratings correspond with the studentsí reading test scores. The study is based on two Finnish longitudinal studies; Jyvaskyla Longitudinal Study of Dyslexia and the First Steps follow-up and the objective was to highlight the assessment methods the class teachers (n = 290) and the special education teachers (n = 75) used in the assessment of reading performance of the first grade students (n = 600). The teachers filled in the questionnaires in the fall and spring semester. The studentsí reading skills were assessed by the teachers both in the fall and spring semester, and also the reading tests were conducted during the fall and spring semester. Furthermore the study focused on the correspondence with the teachersí ratings and the test scores characteristics of certain subskills of reading. (e.g. phonological awareness, letter knowledge). Results indicate that some teachers used a variety of assessment tools while others used only one kind of method. The correlations between the test scores and the teachersí ratings appeared to be moderate or weak (r2 = 51 % ñ 25 %) depending on the subskills assessed, or there was no correlation. The present study clarifies what kind of assessment methods teachers should apply in order to get the most accurate and reliable judgment of the reading skills, which is crucial especially in supporting the lowest performing students.

A one-year intervention program for young children with difficulties in listening comprehension

Experimental studies,Student learning,At-risk students,Writing/Literacy,Early childhood education,Learning in context

Aino Mattinen, University of Turku, Finland; Anu Kajamies, University of Turku, Finland; Pekka Rasanen, Niilo Maki Institute, Finland; Minna M Hannula-Sormunen, University of Turku, Finland; Erno Lehtinen, University of Turku, Finland;

The importance of the quality of instructional support during reading interaction for childrenís adaptive behavior and learning has been emphasized. The aims of the research were to develop the listening comprehension of young children and to develop an evidence-based intervention to help adults to support young childrenís listening comprehension with dialogic reading. Altogether 170 four-year old children participated in the study. A pre-, middle-, post-, and follow-up test design with control group was used. Based on difficulties in listening comprehension and language skills in pretest 46 children were selected for the intervention group and 46 pairwise-matched controls for the control group. Interventions were implemented in daycare by 21 teachers during 20 weekly reading sessions and at home by the parents of 24 children during 10 weekly reading sessions. Dialogic reading intervention called Bunny Stories (Mattinen, et al., 2014) produced positive long-term effects. Intervention group statistically significantly outperformed control group from pre-test to delayed post-test in vocabulary, listening comprehension, narrative comprehension and inference making. Results clearly showed that daycare professionals can effectively promote childrenís comprehension skills with early dialogic reading interventions. We were able to improve the quality of adult-child book sharing interactions by intensively training and providing systematical materials for daycare professionals.

Q 8

29 August 2015 15:45 - 17:15

Room Brown_B1

Paper Presentation

Instructional design

Instructional design

Keywords: Experimental studies,Quantitative methods,Instructional design,Student learning,Social sciences,Higher education,Knowledge creation,Comprehension of text and graphics,Environmental education,Multimedia learning,Cognitive skills,Conceptual change,Misconceptions

Sig's: SIG 2 - Comprehension of Text and Graphics,SIG 3 - Conceptual Change,SIG 6 - Instructional Design

Chairperson: Andreas Nehring, Leibniz Universitat Hannover, Germany

The role of perceptual cues in matrix diagrams

Experimental studies,Quantitative methods,Instructional design,Student learning,Social sciences,Higher education

Jan van der Meij, University of Twente, Netherlands; Marije van Amelsvoort, Tilburg University, Netherlands; Anjo Anjewierden, University of Twente, Netherlands;

An experiment was conducted to assess whether the design of a matrix diagram influences how people study the diagram and whether this has an effect on recall of the presented information. We compared four versions of a matrix diagram on antisocial personality disorder. It consisted of four header cells on top and four on the left, organizing the content in sixteen body cells around four types of personality disorders (antisocial, dependent, schizoid and narcissistic) and four categories within each type (self-image, emotion, behavior, and attitude). Content of the diagram in the four conditions was the same, but the layout was different. Arrows made the orientation of the diagram to be either left-right or top-down, and the personality types were on the left while the categories were on top, or the other way around. 81 participants were asked to study one of these four diagrams for five minutes and do a post-test. Eye movements were recorded to analyze participantsí viewing patterns. We found that participants mainly followed the types when reading the diagram. Participants performed better on the questions that were focused on types than on the questions that focused on categories, regardless of the condition they were in.

Mechanisms behind the testing effect

Experimental studies,Quantitative methods,Instructional design,Student learning,Knowledge creation

Tino Endres, University of Freiburg, Germany; Alexander Renkl, University of Freiburg, Germany;

Abstract The testing effect is a well-established finding. A typical arrangement in the context of meaningful learning comprises a recall task after a first study phase. Different theories in the field provide somewhat different explanations for the positive effects of such recall in terms of the underlying mechanisms. This study examined in the context of learning from expository texts the relevance of mechanisms suggested by three prominent approaches: the transfer appropriate processing theory, the unspecific-goal perspective, and the elaborative retrieval theory. In order to compare the different approaches, we experimentally varied the type of testing task (restudy vs. short-answer problems vs. free-recall) in a within-subject design (N = 47 university students), we assessed mental effort (as indicator of elaboration) during learning, and we analyzed the learning outcomes with different types of posttest types (free-recall and short-answer problems). Thereby, we were able to test the different approaches. We found the following main results: We could replicate the testing effect. We found no evidence for a transfer-appropriate processing effect or an unspecific-goal effect. The testing effect disappeared when statistically controlling for mental effort. This finding shows that testing helps learning when learners have to invest substantial mental effort, as suggested by the elaborative retrieval theory. In order to fully exploit the testing effect, testing tasks should be used that require the learners to invest substantial mental effort.

Learning with 2D- and 3D-Visualizations: The Impact of Spatial Text Information and Spatial Ability

Experimental studies,Instructional design,Comprehension of text and graphics,Environmental education,Higher education,Multimedia learning

Tim Kuhl, University of Mannheim, Germany; Ulrike Kretschmar, formerly: Technical University of Dresden, Germany; Stefan Munzer, Universitat Mannheim, Germany;

It was investigated how spatial text information and spatial ability influenced learning with two-dimensional and three-dimensional visualizations. A 2x2-design with visualization-format (2D vs. 3D) and spatial text information (high vs. low) as independent variables, and spatial ability as a continuous variable was chosen for the domain ìtying knotsî. The performance in tying knots, two picture recognition tests and two cloze tests served as dependent variables. Results revealed that learners performed better in tying knots when they learned with 3D-visualizations and also slightly benefited from spatial text information. For both picture recognition tests, an interaction between spatial ability and visualization-format was observable: Only learners with higher spatial ability profited from 3D-visualizations. For a cloze test that asked for textual information that was given in all conditions, a redundancy effect occurred: Learners receiving 3D-visualizations performed worse when spatial information was given in the text, particularly those with lower spatial abilities.

Using multiple external representations and refutational text to improve box plot interpretation

Experimental studies,Instructional design,Student learning,Cognitive skills,Conceptual change,Misconceptions

Stephanie Lem, KU Leuven, Belgium; Kathy Baert, KU Leuven, Belgium; Eva Ceulemans, KU Leuven, Belgium; Patrick Onghena, KU Leuven - University of Leuven, Belgium; Lieven Verschaffel, KU Leuven, Belgium; Wim Van Dooren, KU Leuven, Belgium;

In this study we used two instructional techniques that seemed powerful to change a specific misinterpretation of box plots, both separately and in combination. First, we used multiple external representations: Histograms were used as an overlay on box plots in order to give students a better insight in the way box plots represent data distributions. Second, we used refutational text to explicitly state and invalidate the area misinterpretation of box plots. Third, we combined multiple external representations and refutational text. We found that refutational text was most successful in improving studentsí interpretation of box plots. The addition of multiple external representations did not increase this effect.

Q 9

29 August 2015 15:45 - 17:15

Room Brown_B2

Paper Presentation

Instructional design

Instructional design

Keywords: Mixed-method research,Educational technology,Instructional design,Multimedia learning,Quantitative methods,Cognitive skills,Professions and applied sciences,Higher education,Experimental studies,Problem solving,Metacognition,Reflection

Sig's: SIG 27 - Online Measures of Learning Processes,SIG 6 - Instructional Design,SIG 7 - Learning and Instruction with Computers

Chairperson: Rachel Lam, National Institute of Education / Nanyang Technological University, Singapore

Does Personalization Promote Learners/ Attention and Learning Processes? An Eye-Tracking Study

Mixed-method research,Educational technology,Instructional design,Multimedia learning

Steffi Zander, Bauhaus-Universitat Weimar, Germany; Maria Reichelt, Bauhaus-University of Weimar, Germany; Stefanie Wetzel, Bauhaus-University Weimar, Germany; Sven Bertel, Bauhaus-University Weimar, Germany;

Formal texts can be personalized by directly addressing learners using for instance personal pronouns instead of indefinite articles. This design recommendation for multimedia learning called personalization principle. Different explanation approaches exist; however, the question of why personalization effects occur is not yet clear. Empirical studies on the processes underlying personalization effects are rare and only self-report methods were used. Therefore, we conducted a study combining eye-tracking and experimental design with 37 participants to gain further insights into the impact of language style on learning. The participants received either a personalized or formal multimedia learning program explaining typical weather phenomena. We examined whether personalized in comparison to formal learning material promotes learners/ attention, motivation, and learning outcomes. The results and practical as well as theoretical implications will be discussed at the conference.

Measuring the comparison process: Learning radiology by case comparisons

Quantitative methods,Instructional design,Cognitive skills,Professions and applied sciences,Higher education

Ellen Kok , Maastricht University, Netherlands; Anique de Bruin, Maastricht University, Netherlands; Jimmie Leppink, Maastricht University, Netherlands; Simon Robben, Maastricht University, Netherlands; Jeroen Van Merrienboer, Maastricht University, Netherlands;

Case comparisons have been found to be effective in many domains, and thus are a promising method for learning complex visual tasks such as diagnosing radiographs. Much less, however, is known about the process of comparison. Eye tracking could provide an insight into this process, as it enables the online monitoring of attention allocation. We investigated the effectiveness of different comparison types for learning to diagnose radiographs and used eye tracking technology to investigate studentsí attention allocation while comparing. Eighty-four medical students studied examples of eight different diseases on chest radiographs, while their eye movements were measured. We investigated the effectiveness of three types of comparison: comparison of images from different patients with the same disease (same-disease comparison), comparison of images showing different diseases (different-disease comparison) and comparison of disease-images with normal images (disease-normal) against a sequential control condition. Performance was measured with a diagnosis test and a localization test afterwards. No differences in performance were found, but participants in the same-disease and different-disease comparison conditions were faster to study the cases than participants in the sequential control condition. Eye tracking proved an informative way of exploring the comparison process. We found comparison in 91% of all trials in the comparison conditions. There was no relationship between the number of comparisons and performance. Not many comparisons were made between abnormalities and normal tissue or between two abnormalities, which is peculiar given that students were required to study the appearance of pathology.

Can Eye Movement Modeling Examples Foster Learning?

Experimental studies,Instructional design,Problem solving,Multimedia learning

Tim van Marlen, Erasmus University Rotterdam, Netherlands; Margot van Wermeskerken, Utrecht University, Netherlands; Halszka Maria Jarodzka, Open University, Netherlands; Tamara Van Gog, Utrecht University, Netherlands;

Eye movement modeling examples (EMME) show students a demonstration of a task by another person, with that personís eye movements superimposed on the task. EMME have been shown to guide studentsí visual attention and foster performance or learning for perceptual classification tasks and insight problems, but one study with procedural puzzle problems found no beneficial effects. Thus, it is still unclear whether the effectiveness of EMME would be restricted to perceptual classification tasks and insight problems. Therefore, the present study investigated EMME with procedural problems in geometry. Prior research showed that only observation of meaningful task-related eye movements enhanced performance on a perceptual classification task. However, one could reason that both meaningful and meaningless EMMEs might raise studentsí overall attention. Thus we included both a meaningful and meaningless EMME condition, to investigate whether this would help or hinder learning, respectively, compared to a no EMME control condition. Participants learned how to solve geometry problems by studying either a meaningful, meaningless, or no EMME superimposed on the video. Results showed no differences in performance and viewing behavior among conditions, which might suggest that EMME are indeed ineffective for teaching procedural problem-solving skills, although the ceiling effect (overall high performance) might have obscured any potential benefits of EMME Therefore, a follow-up study is currently being conducted with more complex and difficult procedural tasks. The results of both studies will be presented at the conference. Combined, these studies may enhance our understanding of the conditions under which EMME are effective for learning.

Was it me? Recognition of Dynamic Eye Movement Replays in a Perceptual Instruction Task

Experimental studies,Instructional design,Cognitive skills,Metacognition,Reflection,Multimedia learning

Margot van Wermeskerken, Utrecht University, Netherlands; Tamara Van Gog, Utrecht University, Netherlands;

Replays of recorded eye movements are increasingly used within educational research to study or enhance learning processes. One of the underlying assumptions in such research is that observers are able to recognize their own eye movements and to meaningfully interpret replays of their own and other peopleís eye movements. Yet, a recent study suggests that observers are not very good at recognizing when an eye movement replay is their own, though interpretation of their own and other peopleís eye movement replays was well above chance. In the current study, we investigated whether recognition improves when participants are informed, prior to recording their eye movements, that they later will be shown their eye movement replays overlaid on the original stimulus (i.e., an image) and that they have to judge which instructions these replays reflect. To this end, participantsí eye movements (n=59) were recorded in response to different

instructions. Half of the participants were informed beforehand about the subsequent judgment task, the other half was not. Subsequently, participants were shown 16 eye movement replays and were asked to judge (by saying this out loud) whether it was their own or someone elseís and what instruction the eye movements reflected. Results indicated that participants performed well above chance on both judgment tasks, irrespective of being informed or not. These findings are promising for studies using eye movement replays to study or enhance learning.

Q 10

29 August 2015 15:45 - 17:15

Room Brown_B3

Paper Presentation

Language education

Language education

Keywords: Conversation/ Discourse analysis,Assessment methods and tools,Language (Foreign and second),Out-of-school learning,Instructional design,Attitudes and beliefs,Self-regulation,Higher education,Model-based reasoning,Mixed-method research,Cognitive skills,Comprehension of text and graphics,Arts ,Language (L1/Standard Language),Early childhood education,Quantitative methods,Teaching/instruction,Achievement,Social sciences,Primary education,Integrated learning

Sig's: SIG 1 - Assessment and Evaluation,SIG 12 - Writing,SIG 18 - Educational Effectiveness,SIG 2 - Comprehension of Text and Graphics

Chairperson: Anett Wolgast, The German Institute for International Educational Research (DIPF), Germany

Learning-Oriented Assessment in EFL classrooms: Synergies between teaching, assessment and research

Conversation/ Discourse analysis,Assessment methods and tools,Language (Foreign and second),Out-of-school learning

Dina Tsagari, University of Cyprus, Cyprus;

Learning-oriented assessment (LOA) is the result of a range of procedures (planned or unplanned) used by teachers during the learning process and is integrated in everyday classroom routines (Purpura & Turner, 2013; 2014; Turner and Purpura, forthcoming). Despite the discussions in the literature, we still know little about the role that unplanned assessments play in learning a foreign language. The present empirical study investigated the nature of unplanned LOA routines used by English teachers in Cyprus. Several lessons were transcribed and analysed

with Atlas.ti informed by research literature on classroom interaction and teacher/peer feedback (Hattie & Timperley, 2007; Lyster & Ranta, 1997; Tunstall & Gipps, 1996) and by constructivist and socio-cultural theories of learning (Brown, 2007; Lightbown & Spada, 2006) and Vygotskyís work (1978). The results demonstrate that LOA is an individual process situated in contextual and collaborative learning within unplanned assessment spaces and based on a layered set of interactions and sociocultural processes. LOA was found to be characterised by a teacher-centred orientation to teaching and an excessive use of the IRF (Initiation-Response-Feedback) pattern where teachers made use of various types of feedback such as ëevaluativeí, ëdescriptiveí and ëcorrectiveí and variants that scaffolded learning in various ways. The paper will illustrate and exemplify instances of unplanned LOA instances and feedback scaffolding and discuss the complexities involved in conceptualising and applying LOA in EFL classrooms. Finally the presentation will make research and pedagogical recommendations aiming at enhancing teachersí LOA practices as part of their broader assessment literacy enhancement.

Effects of Video-Based Peer Observation on Summarizing From Multiple Sources

Instructional design,Attitudes and beliefs,Self-regulation,Language (Foreign and second),Higher education,Model-based reasoning

Mujgan Buyuktas Kara, University of Amsterdam, Turkey; Gert Rijlaarsdam, University of Amsterdam, Netherlands; Elke Van Steendam, KU Leuven, Belgium;

Previous research indicated that explicit strategy instruction and observational learning has positive effects on studentsí writing skills. In this study we tested the effects of peer observation in writing summaries from multiple sources in EFL context. We hypothesized that observational learning has an added benefit on strategy instruction in teaching students L2 writing skills and that it would improve studentsí textual quality, writing processes and motivational orientation. We created a set of strategies, i.e., TRAMPOLINE strategies for writing a summary from multiple sources. 48 pre-faculty level English preparatory school students participated in an experiment with a pre and post-test design. Participants were randomly assigned to three conditions: observational learning, direct strategy instruction and regular curriculum instruction (control group). In the observational learning condition participants observed a peer doing the task while thinking aloud. In the direct strategy instruction condition, the teacher directly taught the TRAMPOLINE strategies to the students. In the regular curriculum instruction condition teachers taught the task without providing strategy instruction. Results indicated that students in the observational learning condition produced higher quality texts by improving source use and finding the main idea, supporting details and relevant examples in the sources. They also improved their task value and self-efficacy compared to other conditions. Students in the direct strategy instruction condition performed better in the delayed post-test in finding the main-ideas. Students in both of the experimental conditions engaged in more divergent activities than writing thus adopted a more process-oriented approach to writing.

Photographs: A tool for promoting language skills

Mixed-method research,Cognitive skills,Comprehension of text and graphics,Arts ,Language (L1/Standard Language),Early childhood education

Ya'ara Gil-Glazer, Tel Hai Academic College, Israel; Ofra Walter, Tel Hai Academic College, Israel; Billie Eilam, University of Haifa, Faculty of Education, Israel;

Still photographs (stills) are iconic images, highly accessible and familiar to children. The rich information represented by stills enables few alternative interpretations, activates prior knowledge, and provokes thoughts and emotions. Therefore, they constitute an effective tool for promoting language learning among children. The study examined and assessed the effect of photograph-based tasks on second and fifth gradersí specific language skills, during a ten lesson long intervention. This effect was examined in relation to age, gender, and language level of students. Classrooms were assigned to experimental or control groups. Each one-hour weekly lesson comprised two parts: (a) a teacher-led classroom discussion and feedback about the previous week's task, and (b) studentsí responses to the same task each week, using increasingly complex photographs. Tasks consisted of a set of open questions that targeted specific language skills. A sample of students was interviewed, based on their performance. Pre and Post photograph-based tasks were administered to both student groups. Findings indicated significant advancement among the experimental group in the application and use of the targeted language skills, and no significant improvement among the control group. The study enhances understanding of the relation between words and images and suggests ways to promote cognitive verbal abilities through the use of photographs.

The effect of Content and Language Integrated Learning on English performance and self-confidence

Quantitative methods,Teaching/instruction,Achievement,Social sciences,Primary education,Integrated learning

Marrit Jansma, Fryske Akademy/ University Groningen, Netherlands; Alexander Minnaert, University of Groningen, Netherlands; Edwin Klinkenberg, Fryske Akademy, Netherlands;

In this study, it was investigated whether third language teaching through Content and Language Integrated Learning (CLIL) was more effective than teaching a third language as an isolated subject. By means of a cross-sectional study design, English vocabulary, speaking performance and self-confidence of pupils from CLIL and non-CLIL schools were compared. In total, 575 pupils of 4th, 5th and 6th grade (age 9-12) from primary schools in the Netherlands took part in this study. They were administered a vocabulary and a picture story task to measure English speaking performance. In addition, a questionnaire concerning self-confidence was administered. First results of the study revealed that 4th and 5th grade pupils from CLIL schools scored significantly higher on the vocabulary task and the picture story task than pupils from non-CLIL schools. However, in 6th grade, these effects were not found; pupils of 6th grade from non-CLIL schools were nearly equally proficient in English performance compared to pupils from CLIL schools. Interestingly, pupils from CLIL schools stated that they did not have more self-confidence during English performance. On the contrary, CLIL pupils of 6th grade claimed to avoid speaking in English. To conclude, although these findings suggest that particularly pupils of 4th and 5th grade profit from CLIL teaching, pupils of 6th grade do not seem to profit as much from CLIL teaching. This apparent immediacy effect can be due to the degree of exposure and

practice of English. More details and further research of effectiveness of CLIL will be discussed upon.

Q 11

29 August 2015 15:45 - 17:15

Room Brown_B6

Paper Presentation

Learning in context

Learning in context

Keywords: Meta-analysis,Teaching/instruction,Learning approaches,Citizenship education,Primary education,Lifelong learning,Quantitative methods,Second language acquisition,Achievement,Language (Foreign and second),Secondary education,Content analysis,Student learning,Reflection,Professions and applied sciences,Vocational education,Learning in context,Mixed-method research,Social aspects of learning,Social sciences

Sig's: SIG 10 - Social Interaction in Learning and Instruction,SIG 14 - Learning and Professional Development,SIG 21 - Learning and Teaching in Culturally Diverse Settings,SIG 25 - Educational Theory

Chairperson: Liesbeth Baartman, Utrecht University of Applied Sciences, Netherlands

Creating innovative and powerful learners: A multidisciplinary framework

Meta-analysis,Teaching/instruction,Learning approaches,Citizenship education,Primary education,Lifelong learning

Tim Post, University of Twente, Netherlands; Juliette Walma van der Molen, University of Twente, Netherlands;

Ongoing efforts to explicate the 21st-century skill set in terms of relevant knowledge, skills and attitudes have not yet resulted into the development of (a) a conceptual framework that provides clear, operationalized descriptions of the qualities of mind that ñ based on a multidisciplinary synthesis of the scientific literature on this topic ñ are considered relevant to the skill set of the 21st-century learner; (b) a coherent approach to pedagogy and to school development that is directly targeted at developing these qualities in students; and (c) practical measuring instruments that teachers can use to reliably assess to what extent these qualities are effectively being developed in students over time as a result of ë21st-century focusedí teaching. The absence of such a multidisciplinary toolkit has likely slowed down educational reform. In our theoretical paper, we propose a multidisciplinary framework that synthesizes a range of multidimensional abilities that are considered relevant to studentsí cognitive development. At the EARLI

conference, we will provide a summary of our literature review and a reflection of the manner in which our framework was constructed. We also argue that our framework serves as a valuable conceptualization of the skill set of the 21st-century teacher and the potential curriculum of ë21st-century focusedí teacher training programs. We believe that our proposed multidisciplinary framework adds both theoretically and practically to current discussions on the further operationalization of the 21st-century learner and teacher.

Ethnic minority classroom composition: Do peers affect studentsí language achievement?

Quantitative methods,Second language acquisition,Achievement,Language (Foreign and second),Secondary education

Camilla Rjosk, Humboldt-Universitat zu Berlin , Germany; Julian Seuring, University of Bamberg, Germany; Petra Stanat, Humboldt Universitaet Berlin, Germany;

The proportion of ethnic minority students in a classroom can affect individual studentsí language-related abilities. One discussed factor underlying this compositional effect is minority language usage among peers (Van Ewijk & Sleegers, 2010a). Based on a sample of 12682 students in 732 classrooms in the German education system, we analyzed the relationship between the proportion of minority students in a classroom and individual German reading achievement within a multilevel framework. In addition, we explored the hypothesized mediating effect of non-German language usage among classmates. Our findings indicate that students in classrooms with higher proportions of ethnic minority students reach slightly lower levels of reading achievement. This negative association was less pronounced when the students only spoke German with their classmates. Thus, language usage among peers seems to contribute to compositional effects. The negative association between proportion of minority students and reading achievement was especially pronounced for individual ethnic minority students.

Promoting reflective practices through (web-based) learning documentations in VET systems

Content analysis,Student learning,Reflection,Professions and applied sciences,Vocational education,Learning in context

Valentina Caruso, Swiss Federal Institute for Vocational Education and Training (SFIVET), Switzerland; Alberto Cattaneo, Swiss Federal Institute for Vocational Education and Training, Switzerland; Jean-Luc Gurtner, University of Fribourg, Switzerland; Carmela Aprea, Friedrich-Schiller-University Jena, Germany;

Swiss Vocational Education and Training (VET) is a dual-track system where apprentices weekly alternate between school and workplace. At the workplace, they have to keep a learning documentation throughout their training in which they are expected to regularly document their professional development. However, the actual use of this ìLearning and Performance Documentationî (LPD) remains limited, and its potential for fostering reflection and knowledge acquisition is underexploited. The study presented in this paper intends to shed light on the current practices and issues related to the use of the LPD in the Swiss VET system. Furthermore,

it intends to clarify if a web-based LPD could offer an additional value as a shared space (i.e., as a boundary object) between different VET locations. N=29 semi-structured interviews were conducted in the Italian-speaking part of Switzerland (Canton Ticino) with representatives of all the main actors of the Swiss VET system for each professional domain (i.e., Industrial & Handicraft, Commerce, Health & Social Care). Findings show that all the actors of VET do not have a same conception of the aims and functions of such a learning documentation both within and across professions. However, most stakeholders agree that a web-based LPD could help to overcome current problems of this object and could represent a good way to bridge the gap they perceive between the various learning locations in VET.

Authentic Learning in Hong Kong Curriculum: Student Holistic Development and Unleash Potential

Mixed-method research,Social aspects of learning,Social sciences,Secondary education,Learning in context

Susanna WS Cheung, Education Bureau, HKSAR, Hong Kong;

Authentic Learning has generated positive results in student development. This study reports on the development of Other Learning Experiences (OLE) and Student Learning Profile (SLP) as one example of employing authentic learning to enhance social and affective development, nurture leadership skills and develop reflective habits, in the context of the new senior secondary curriculum reform in Hong Kong since 2009. In such reform, schools are recommended to offer OLE/SLP to facilitate studentsí all-round development. OLE/SLP can be regarded as pioneering in its cultural context to the target participants. Students in Hong Kong were traditionally described as examination-oriented. A majority of them lack authentic learning experiences and reflective habits. The present study shows that the youth in Hong Kong can largely benefit from authentic learning and reflection on their learning experiences. Sense of leadership, learning competency, reflective habits and goals of life were found as significant results of studentsí social and affective development. The concerns of students and teachers during the study were also identified through reflective statements. The study contributes to a better understanding of the effects of authentic learning and reflective habits on Hong Kong learners.

Q 12

29 August 2015 15:45 - 17:15

Room Brown_B5

Paper Presentation

Motivation

Motivation

Keywords: Experimental studies,Student learning,Problem solving,Science education,Higher education,Learning in context,Quantitative methods,Language (Foreign and second),Primary education,Motivation and emotion,Mixed-method research,Emotion and affect,Social sciences,Self-efficacy,Secondary education

Sig's: SIG 8 - Motivation and Emotion

Chairperson: Bobby Hoffman, University of Central Florida, United States

Can we disguise physics? The effects of contextual features on studentsí motivation and performance

Experimental studies,Student learning,Problem solving,Science education,Higher education,Learning in context

Marcela Pozas, University of Koblenz-Landau, Germany; Patrick Loffler, University of Koblenz-Landau, Germany; Wolfgang Schnotz, University of Koblenz-Landau, Germany; Alexander Kauertz, University of Koblenz-Landau, Germany;

Research has shown, real-life problems (i.e., context-based problems) in science education improve studentsí attitudes towards science, and hence their performance (Bennett, Lubben, & Hogarth, 2006). Despite extensive research on context-based problems, it is still unclear how such characteristics of physics tasks influence studentsí motivation. The aim of the current study was to examine how the context-based characteristics of physics problems influence studentsí situational interest, anxiety, and probability of success, and whether this influence is moderated by studentsí prior knowledge and their cognitive abilities. For this purpose, eight different versions of a thermodynamics task varying in terms of contextualization and transparency were used. Results showed that motivational variables evolve in the different conditions.

What's outside matters: Situational perceptions trump existing motivations for student engagement

Quantitative methods,Language (Foreign and second),Primary education,Motivation and emotion

Quint Oga-Baldwin, Fukuoka University of Education, Japan; Yoshiyuki Nakata, Hyogo University of Teacher Education, Japan;

Background: Both internal motives and the external environment have been indicated as important to learning outcomes. According to self-determination theory, high quality autonomous motivation comes from the dialogic alignment of the person and the environment and leads to stronger learning outcomes. Aims: This study aims to clarify the relationship between motivation, classroom environment, student engagement, and teacher assessment. Methods: Elementary students in western Japan (n=434) completed surveys at three times during the 2013 school year. Pre and post surveys recorded motives, while a process model was used to model supportive teaching, need satisfaction, and engagement. Longitudinal structural equation

modeling was used to analyze responses. Teacher assessment and external observation were used to externally triangulate self-report measures. Results: Motivational orientations at the beginning of the school year had some influence on perceptions of supportive teaching and need satisfaction, but no direct relationship with engagement. Classroom processes and perceptions showed a much stronger influence on engagement, partially mediated by need satisfaction. Significant auto-correlations were found for each set of motives. Engagement had a direct effect on end-of-year motivation, indicating a potential indirect reciprocal relationship. Teacher assessment was influenced by engagement, but not motivation. Student engagement, but not motivation, was also recognizable to external observers. Conclusions: Results indicate that engagement, rather than motivation, may be more salient to teachers and observers. Motivation indirectly influences engagement through perceptions of supportive teaching and need satisfaction, but does not affect teachersí assessment. Teaching to promote in-class engagement may thus improve motivation and learning outcomes over time.

Exploring generation and development of interest in mobile science learning environment

Mixed-method research,Emotion and affect,Social sciences,Primary education,Motivation and emotion

Marjaana Veermans, University of Turku, Finland; Erkka Laine, University of Turku, Finland;

Earlier studies on generation of interest have indicated that novelty and challenge in tasks and activities support development of interest. In this study interest is defined especially by its affective component since it is assumed to have stronger role in the earlier phases of interest development, and younger studentsí interpretations are found be related more to the affective component than to the cognitive component. The aim of the study was to examine ways studentsí interest and engagement is generated and developed over time in a mobile science learning environment. The participants of the study were 122 lower secondary school students (age 12-13 years. One class of the participants was an experimental group who entered in the new science learning environment while the rest of the students formed a control group. The students answered pre-tests consisting of subject-specific individual interest in math, chemistry and physics, and biology. Furthermore, interest in technology and interest in collaboration were measured. Same tests were administered in midterm, and will be administered again at the end of the term. In addition, the students were interviewed in small groups in midterm. The results indicated that new learning environment had positively triggered studentsí interest by offering multidisciplinary assignments and resources, which was visible also in increase of individual interest in math and biology. From educational policy point of view these results are promising since the core of the new curriculum in Finland will be based on multidisciplinary activities.

Validity of intrinsic and extrinsic motivation: Relations with self-efficacy and life satisfaction

Quantitative methods,Self-efficacy,Primary education,Secondary education,Motivation and emotion

Age Diseth, University of Bergen , Norway;

The present study aims at investigating the factor structure of a scale measuring intrinsic and extrinsic motivation, and to relate these variables to external criterions in terms of self-efficacy and life satisfaction among Norwegian lower and upper secondary school students. Intrinsic and extrinsic motivation was originally viewed as contrasting ends of single dimension. Hence, measurement scales were constructed accordingly, and participants had to choose between response alternatives reflecting either intrinsic or extrinsic motivation (Harter, 1981). However, subsequent research has concluded that intrinsic and extrinsic motivation should be measured as independent variables (Lepper, Corpus, & Iyengar, 2005). Hence, measurement scales have been developed accordingly, with intrinsic motivation operationalized as preference for challenge, curiosity and independent mastery, and extrinsic motivation defined as preference for easy work, pleasing teacher, and dependence on teacher. The current study showed that an item-level factor analysis supported a one-factor solution for intrinsic motivation, accounting for all three subscales in one single dimension, and a three-factor solution for the extrinsic motivation scale. Both self-efficacy and life satisfaction were positively related to intrinsic motivation, but not significantly related to extrinsic motivation. However, the particular subscales of extrinsic motivation were differentially related to self-efficacy and life satisfaction, thus supporting the multi-dimensionality of extrinsic motivation.

Q 13

29 August 2015 15:45 - 17:15

Room Brown_B4

Paper Presentation

Motivation

Motivation

Keywords: Quantitative methods,Student learning,Emotion and affect,Vocational education,Motivation and emotion,Self-regulation,Language (L1/Standard Language),Secondary education,Learning in context,Teaching/instruction,Attitudes and beliefs,Learning analytics,At-risk students,Goal orientation,Technology,Higher education

Sig's: SIG 8 - Motivation and Emotion

Chairperson: Jenefer Husman, Arizona State University, United States

Determinants and Effects of Apprenticesí Intrinsic Learning Motivation in a Dual Training System

Quantitative methods,Student learning,Emotion and affect,Vocational education,Motivation and emotion

Simone Berweger, University of Teacher Education Zurich, Switzerland; Patrizia Salzmann, University of Teacher Education St.Gallen, Switzerland;

In this paper we investigate how intrinsic learning motivation (ILM) can be explained in the context of vocational education and training (VET), and how it influences apprenticesí satisfaction with the apprenticeship and their affective occupational commitment (AOC). Based on self-determination theory and person-object theory of interest we hypothesize that apprentices are intrinsically motivated to learn when in-company training allows for the experience of competence, autonomy and social relatedness, and that individual characteristics and attributes of learning situations directly and indirectly influence apprentices motivation, mediated by the experience of the three basic needs. We assume that apprenticesí ILM predicts their satisfaction with the apprenticeship and their AOC. Longitudinal data from a sample of 529 Swiss apprentices in healthcare, social care and construction is analyzed to test the hypotheses, using structural equation modeling. Perceived fit of individual competencies, interests and personal values with the apprenticeship, the working atmosphere in the company and apprenticesí experience of competence had a direct influence on apprenticesí ILM half a year later, but not their experience of autonomy and social relatedness Furthermore, perceived fit and the working atmosphere indirectly influenced apprenticesí ILM through the experience of feeling competent. ILM was associated with satisfaction and AOC. The study offers insight into characteristics of in-company training that are not only important for learning motivation and satisfaction in VET but also for apprentices to remain in the chosen occupation after graduation.

Self-regulated Learning in Language, Scholastic Competence, Self-Esteem: Exploring the Connections

Quantitative methods,Student learning,Self-regulation,Language (L1/Standard Language),Secondary education,Learning in context

Ioanna Voulgaridou, Democritus University of Thrace, Greece; Constantinos Kokkinos, Democritus University of Thrace, Greece;

The aim of the present study was to investigate possible interactive links between self motivational beliefs, scholastic competence, self-esteem, and learning strategies used by 134 Greek junior high school students in the subject of Greek language. Participants completed self-reported measures of the above constructs. Two models were tested through multiple mediation analyses in order to predict participant learning strategies in language. Results of the multiple mediation analyses showed that in terms of Model 1, scholastic competence predicted all learning strategies both directly and indirectly through its effects on intrinsic goal orientation and task value. Moreover, self-esteem predicted both learning strategies indirectly through intrinsic goal orientation, and only the resource management strategies directly. With regards to Model 2, scholastic competence predicted learning strategies both directly as well as indirectly through the five motivational orientations (except for test anxiety). Self-esteem on the other hand, did not emerge as a significant mediating variable, nor had any direct effects on learning strategies. The findings are discussed in terms of their educational implications.

Teacher support versus thwart: Their importance to motivation, self-regulation and need satisfaction

Quantitative methods,Teaching/instruction,Attitudes and beliefs,Secondary education

Marie-Christine Opdenakker, University of Groningen, Netherlands;

Research has established that studentsí learning environment experiences (teacher support/behaviour towards students) contribute to studentsí learning and motivation. According to self-determination theory (SDT), (perceived) teacher support (structure, autonomy, involvement) plays an important role in relation to the fulfillment of studentsí basic psychological needs and therefore, to studentsí motivation, engagement and self-regulation. However, controlling instructional behaviour, chaos in the classroom and teacher rejection and neglect, are supposed to be a treat. In the past, the thwarting dimensions were seen as the opposite poles of the supportive dimensions, but recently some SDT researchers (e.g., Bartholomew et al., 2011; Tessier et al., 2008) have questioned this and study them as separate dimensions. In the current study, intercorrelations between support and thwart dimensions were studied as well as effects of these dimensions on aspects of student motivation, self-regulation and need satisfaction. Participants were 566 students belonging to 20 Mathematics/English grade-1 secondary education classes in The Netherlands. Correlations indicated a rather modest covariance between corresponding support and thwart dimensions indicating some evidence for putting into question the bipolarity of the dimensions. Multilevel analyses revealed evidence for the importance of both teacher support and thwart dimensions, explaining respectively between 2-27% and 3-19% of the total variance in student outcomes. Furthermore, depending on the student outcome, support and thwart was equally important or one was clearly more important than the other. Findings highlight the importance of paying attention to both teacher support and thwart dimensions in daily classrooms. Implications for teacher practice will be discussed.

Examining the Motivational Implications of a Learning Analytics Intervention Designed for Advisors

Learning analytics,At-risk students,Goal orientation,Technology,Higher education,Motivation and emotion

Stephen Aguilar, University of Michigan, United States; Stuart Karabenick, University of Michigan, United States; Steven Lonn, University of Michigan, United States; Stephanie Teasley, University of Michigan, United States; Lawrence Cho, University of Michigan, United States;

Summer bridge programs are designed to improve retention and academic success among at-risk populations in postsecondary education by focusing on helping students to develop skills, behaviors, and high impact practices that promote their academic success. Our study describes the second iteration of an ongoing design-based research agenda centered on understanding the implementation of a learning analytics powered early warning system (EWS) named "Student Explorer," which is designed to provide academic advisors with timely information regarding the progress of summer bridge students. Framed within achievement goal theory (AGT), and

building on previous research, we examined changes in studentsí academic motivation orientations during a seven-week bridge program. Specifically, we modeled how changes in motivation were related to what occurred during 1-on-1 meetings with academic advisors. During these meetings students had the potential to view to representations of their achievement embedded within Student Explorer. Results indicated that (a) studentsí performance-avoid, performance-approach, and mastery achievement goal orientations decreased over the course of the program, (b) the decrease in performance orientation was less when academic advisors provided students with information about studentsí academic performance, and (c) students' decrease in mastery orientation was greater for students whose advisors provided them with information comparing their performance to other students. The findings strongly suggest that information utilized and represented through learning analytics based interventions needs to be carefully considered given its potential to influence studentsí academic motivation, and thus potentially shape their subsequent academic success.

Q 14

29 August 2015 15:45 - 17:15

Room Cyan_F1

Paper Presentation

Problem solving and reasoning

Problem solving and reasoning

Keywords: Meta-analysis,Instructional design,Student learning,Teaching/instruction,Problem solving,Reasoning,Quantitative methods,Social interaction,Higher education,Cooperative/collaborative learning,Cognitive skills,Competencies,Mathematics,Science education,Pre-service teacher education,Social sciences

Sig's: SIG 1 - Assessment and Evaluation,SIG 26 - Argumentation, Dialogue and Reasoning,SIG 4 - Higher Education

Chairperson: Quincy Elvira, Radboud University Nijmegen, Netherlands

Fostering Scientific Reasoning: A Meta-Analysis on Intervention Studies

Meta-analysis,Instructional design,Student learning,Teaching/instruction,Problem solving,Reasoning

Katharina Engelmann, Ludwig-Maximilians-Universitat (LMU), Germany; Frank Fischer, Ludwig-Maximilians-Universitat (LMU), Germany;

Scientific reasoning skills are important for participating in scientific debates but also in our everyday lives. The current state of research on supporting scientific reasoning includes intervention studies but lacks an overview on approaches to foster scientific reasoning and their effects. This meta-analysis analyzes effect sizes taken from 15 empirical studies using a random-effects model. The results show a high mean effect of interventions on scientific reasoning. Moreover, the success of the interventions can partly be explained by moderator variables such as the learning activities facilitated in the intervention. Surprisingly, constructive learning activities yielded larger effects than interactive learning activities. The activities were only inferred from the description of the intervention. Moreover, this result raises the question whether the learning activities should be further differentiated in order to adequately analyze learning and predict its outcome. This meta-analysis included a small number of studies. Further research is needed to empirically test the effects found in this meta-analysis.

Internal scripts and social context as antecedents of teacher students' scientific reasoning

Quantitative methods,Reasoning,Social interaction,Higher education,Cooperative/collaborative learning

Andras Csanadi, Ludwig-Maximilians-Universitat (LMU), Germany; Ingo Kollar, University of Augsburg, Germany; Frank Fischer, Ludwig-Maximilians-Universitat (LMU), Germany;

Competent problem solving of teachers requires them to adequately engage in scientific reasoning processes by performing an optimal sequence of epistemic activities and applying scientific content knowledge. Yet, studies show that teacher students show various difficulties when they need to use such skills. Our study aims to investigate possible psychological antecedents of such difficulties. We accounted for learnersí internal scripts on scientific reasoning, the presence or absence of a social context (dyadic vs individual problem solving) in which scientific reasoning took place,and the homogeneity vs. heterogeneity of learning partnersí internal SR scripts. 39 German teacher students solved a problem case either individually or in dyads. The results of one-factorial ANOVAs showed that students in dyads used less scientific content than individuals. Moreover, heterogeneity of internal SR scripts of dyadic members seemed to account for that effect, as only members of heterogeneous dyads performed significantly lower than individuals. These results might demonstrate a collaborative interference (Hirst & Echterhoff, 2012) between dyadic members. Although follow-up analyses could give us more elaborated insight on the quality of scientific reasoning processes, we can already see that group heterogeneity can be an antecedent of suboptimal scientific reasoning. Therefore, instructional support targeting the improvement of teacher studentsí collaborative learning and reasoning should take it into account.

Coherence and Capability Utilisation: Development of problem solving competence across 41 countries

Quantitative methods,Cognitive skills,Competencies,Problem solving,Mathematics,Science education

Jens F. Beckmann, Durham University, United Kingdom; Ronny Scherer, University of Oslo, Norway;

Based on a ëproblem solving as an educational outcomeí point of view, we analyse the contribution of math and science competence to analytical problem-solving competence and link the acquisition of problem solving competence to the coherence between math and science education. We propose the concept of math-science coherence and explore whether society-, curriculum-, and school-related factors confound with its relation to problem solving. By using the PISA 2003 data set of 41 countries, we apply multilevel regression and confounder analyses to investigate these effects for each country. Our results show that (1) math and science competence significantly contribute to problem solving across countries; (2) math-science coherence is significantly related to problem solving competence; (3) country-specific characteristics confound this relation; (4) math-science coherence is linked to capability under-utilisation based on science performance but less on math performance. In sum, low problem solving scores seem a result of an impeded transfer of subject-specific knowledge and skills (i.e., under-utilisation of science capabilities in the acquisition of problem solving competence), which is characterised by low levels of math-science coherence.

An analysis of student performance on everyday problem solving tasks

Pre-service teacher education,Problem solving,Reasoning,Social sciences,Higher education

Nur Cakir, Hacettepe University, Turkey; Nuray Senemoglu, University Hacettepe, Turkey;

Students have more experience in solving well-structured problems as they are more common in the educational setting. However problems faced in everyday practice are generally ill-structured problems which may have many equally effective alternative solutions (Jonassen, 1997). This study investigates pre-service teachersí problem solving strategies in social sciences/in everyday situations, determine their tendencies and deficiencies, and explore the differences between problem solving behaviors of freshmen and seniors. 72 students were asked to solve ill-structured problem scenarios and the data was analyzed quantitatively to observe studentsí problem solving behaviors, whether there is a significant difference between freshmen and seniors, and whether there is a relation between problem solving and academic achievement. The results revealed that students had particular difficulty in providing adequate support for their solutions and lacked arguments that evaluate their proposals in terms of their pros and cons. No significant differences were observed between freshmen and seniors in terms of defining the problem, decomposing the problem into sub-problems and evaluating the proposed solution, and there was no significant relationship between problem solving skills and academic achievement. The implications of these findings for curriculum designers, educators in higher education and education policy makers will be discussed.

Q 15

29 August 2015 15:45 - 17:15

Room Brown_B7

Paper Presentation

Self-efficacy

Self-efficacy

Keywords: Quantitative methods,Student learning,Intelligence,Self-efficacy,Higher education,Motivation and emotion,Mixed-method research,Qualitative methods,Assessment methods and tools,Attitudes and beliefs,Science education,Game-based learning,In-service teacher education,Mathematics,Inquiry learning

Sig's: SIG 11 - Teaching and Teacher Education,SIG 13 - Moral and Democratic Education,SIG 7 - Learning and Instruction with Computers,SIG 8 - Motivation and Emotion

Chairperson: Annelies Kreis, University of Teacher Education Thurgau, Switzerland

Intelligence and scholarly information-seeking: Moderating effects of domain-specific self-efficacy

Quantitative methods,Student learning,Intelligence,Self-efficacy,Higher education,Motivation and emotion

Tom Rosman, Leibniz-Institute for Psychology Information (ZPID), Germany; Anne-Kathrin Mayer, ZPID, Germany;

The aim of the present study was to investigate the importance of both intelligence and domain-specific self-efficacy for scholarly information-seeking skills. Consistent with self-efficacy theory, it was assumed that self-efficacy positively influences motivational outcomes (e. g., effort and persistence) in the respective domain. Thus, even though intelligence constitutes a basic requirement for developing information-seeking skills, only students with a high sense of self-efficacy will make use of this cognitive potential. To investigate this, a moderator effect of domain-specific self-efficacy on the relationship between cognitive ability (i. e., verbal and fluid intelligence) and information-seeking skills was hypothesized: The relationship between intelligence and information-seeking skills is significant and positive only for students with a high sense of domain-specific self-efficacy. In a study with N = 121 psychology students, the postulated moderator effect was found for both verbal and fluid intelligence. The findings thus highlight the importance of domain-specific self-efficacy expectations in the development of information-seeking skills.

Constructivist learning perceptions and academic self-efficacy in higher education

Mixed-method research,Qualitative methods,Quantitative methods,Assessment methods and tools

Dorit Alt, Kinneret College on the Sea of Galilee, Israel;

This study was aimed at mapping features of constructivist activities in higher education settings, constructing and validating a new scale for measuring their presence in their learning environments. A mix-method approach was implemented in three phases. The first phase was aimed at qualitatively analysing classroom observational activities as experienced by students, in order to learn about actual instantiations of the theoretical constructivist features. The results foregrounded eight categories: 'knowledge construction', 'authenticity', 'multiple perspectives', 'prior knowledge', 'in-depth learning', 'teacher- student interaction', 'social interaction' and 'cooperative dialogue'. The second phase was aimed at developing a questionnaire, based on the descriptions gathered in Phase 1. The third quantitative phase was used to validate the developed questionnaire (Constructivist Learning in Higher Education Settings scale [CLHES]) by using structural equation modeling. In addition, students' academic self-efficacy had been chosen as a criterion variable in order to further assess construct validity of the CLHES. The scales were submitted to 597 undergraduate third-year college students. According to the main results, construct validity of the new scale has been confirmed; teacher-student and student-student interactions ('social interaction' and 'cooperative dialogue') were positively connected to self-efficacy for learning. Implications of these findings and directions for future research are discussed.

Learning with Quiz, Simulation and Adventures: Studentsí Perceptions and Attitudes Towards Learning

Quantitative methods,Assessment methods and tools,Attitudes and beliefs,Science education,Higher education,Game-based learning

Claudia Schrader, Ulm University, Germany; Valentin Riemer, Ulm University, Germany;

Studentsí attitude, their perception of cognitive and affective quality as its predictors, and the resulting usage-intention towards learning with serious games in general and more specific towards three different types of serious games that are, quiz, simulation and adventure, were examined. A two-study sequence was conducted that aimed to develop and refine an instrument including these variables, and to use this instrument to examine studentsí attitude, cognitive and affective perception and usage-intention for learning with serious games, and differences in these variables for the three serious game types. Results indicate that the instrument shows high reliability and convergent validity and that students consequently had positive cognitive and affective perceptions, attitudes, and usage-intention towards learning among all three game types. A MANOVA, however, indicated differences between game types in general. Further, there was a significant difference due to gender. Whereas the investigation in serious games in general showed that females reported significantly higher negative perception of affective quality compared to males, asking students for the specific game types revealed a more detailed picture: In contrast to previous findings in literature, female students not only reported both negative and positive perception of quality than males but also a more positive attitude. These results indicate the importance of examining the types of serious games separately and considering gender when evaluating studentsí attitudes towards learning with serious games.

Teachersí efficacy beliefs and practices in using inquiry ñ based approach in mathematics

Quantitative methods,In-service teacher education,Mathematics,Inquiry learning

Areti Panaoura, Frederick University, Cyprus;

Teachers are expected to create the appropriate learning environment in order to challenge their students to investigate and explore the mathematical concepts. The present study focuses on the investigation of in-service teachersí self-efficacy beliefs about the use of inquiry-based approach in the teaching of mathematics and on the identification of the difficulties they face during the implementation of the approach. Results of a quantitative study which used a questionnaire for measuring teachersí self-efficacy beliefs and the respective practical implications indicated that they believe in the positive value of inquiry-based approach and they express high self-efficacy beliefs in using the respective teaching processes. However they have difficulties in managing the time limitations in respect to allocated teaching hours and the teaching processes in reacting on their studentsí different responses about open-ended problems. Suggestions for the implementation of the inquiry-based approach in mathematics are discussed and for the development of appropriate in-service training programs.

Q 16

29 August 2015 15:45 - 17:15

Room Blue1_C1

Paper Presentation

Self-regulation

Self-regulation and emotion and affect

Keywords: Video analysis,Student learning,Metacognition,Self-regulation,Social aspects of learning,Social interaction,Qualitative methods,Attitudes and beliefs,Social sciences,Primary education,Motivation and emotion,Experimental studies,Instructional design,Emotion and affect,Reasoning,Higher education,Researcher education,Writing/Literacy

Sig's: SIG 12 - Writing,SIG 16 - Metacognition,SIG 6 - Instructional Design,SIG 8 - Motivation and Emotion

Chairperson: Riikka Hirvonen, University of Jyvaskyla, Finland

Unravelling the tutoring processes during student tutoring

Video analysis,Student learning,Metacognition,Self-regulation,Social aspects of learning,Social interaction

Sabrina Vandevelde, Ghent University, Belgium; Hilde Van Keer, Ghent University, Belgium;

This study focuses on an unexplored topic within the research field of tutoring, namely studying tutoring processes during student tutoring focusing on self-regulated learning (SRL). During a 10 week during student tutoring programme, two tutoring groups were studied in-depth throughout the programme. By means of video-analysis (710 minutes of video data) tutor and tutees interactions were studied. The current results provide a detailed overview of tutor and tutees activities, confirming that tutors encounter difficulties to establish high-quality tutoring processes encouraging effective SRL. Further, the results underline the importance of improving tutor training and ongoing support as one possible avenue to optimise the effects of student tutoring.

Investigating childrenís ability-related perceptions in the classroom context

Qualitative methods,Attitudes and beliefs,Self-regulation,Social sciences,Primary education,Motivation and emotion

Elina Maatta, University of Oulu, Canada; Sanna Jarvela, University of Oulu, Finland; Nancy Perry, University of British Columbia, Canada;

This study investigated elementary school childrenís (N=24, 6ñ8 years old) ability-related perceptions in social and independent learning situations. The aim was to investigate how ability-related perceptions are created in different types of learning activities and how stable these perceptions are across them. The participants were videotaped in 45 social (whole-class and small-group) and 15 independent learning situations, and later interviewed about their ability-related perceptions using video-stimulated recall. Using qualitative content analysis, participants with high ability-related perceptions were found to demonstrate more stable perceptions and greater involvement in social learning situations. Participants also identified four factors influencing their ability-related perceptions: positive emotional states, mastery experiences, personal strategic behavior, and contextual feedback and support. Interestingly, children who had low ability-related perceptions did not experience getting any support and feedback from the teacher. These results show that children in kindergarten to second-grade have distinct self-perceptions related to their abilities which influence strongly to their motivation to learn. As early educational experiences have immediate and long-term effects on cognitive and social development and achievement, these findings can provide important information for practice.

Affective influences on improving studentsí reasoning: Mood states, expectation and time-pressure

Experimental studies,Instructional design,Emotion and affect,Reasoning,Higher education

Anita Heijltjes, Avans Hogeschool, University of Applied Sciences, Netherlands; Tamara Van Gog, Utrecht University, Netherlands; Fred Paas, Erasmus University Rotterdam/University of Wollongong, Netherlands;

Reasoning task performance has been shown to be positively affected by instructions to teach critical thinking, specifically unbiased reasoning. The question addressed in the present study, is whether the effects of such instructions are mediated by affective factors such as mood states,

expectations, and perceived time-pressure. Based on Stanovichís (2011) dual processing framework we conducted three experiments to investigate whether a positive, negative, or a neutral mood state would affect instructional effects on reasoning task performance differently, and 2) whether additional intentional cues (expectations) on top of induced mood states and instructions, or 3) additional time-pressure cues would affect learning outcomes in different ways. The first experiment revealed that instructions had positive effects on reasoning performance, but no effects of mood states were found, suggesting that instructions might have overruled the automatic reasoning to which mood states are linked. The second experiment revealed that encouraging students to thoroughly study instructions was more beneficial for reasoning performance than instructions stating that students could rely on prior knowledge to complete the test. The third experiment showed that students in the no time-pressure condition performed better than their controls in the time-pressure condition, while their time-on-task did not differ significantly. No interactions between mood state and expectation or mood state and time-pressure were found. Despite the generally positive effects of instructions, this study shows that learning to improve reasoning performance can be easily constrained by intentions conveyed to participants that open the door to automatic processing and by perceived time-pressure.

Combination of Strategies to Develop Academic Writing Competence - Which Role Plays Self-Monitoring?

Experimental studies,Researcher education,Self-regulation,Writing/Literacy,Higher education

Anke Wischgoll, University of Freiburg, Germany; Alexander Renkl, University of Freiburg, Germany;

Academic writing competence is essential for scientists. A particular challenge in competent writing is to take the reader/s view into account (i.e., knowledge crafting). For knowledge crafting, the writer has not only to possess knowledge about appropriate text structures but also to monitor and coordinate multiple representations in working memory, especially representations related to the text itself, the own intentions as author, and possible readers. We tested if the development of knowledge crafting can be effectively supported by teaching a combination of strategies for the application of text structure knowledge and for self-monitoring. More specifically, we asked (a) whether self-monitoring strategies are of particular relevance for competent writing and (b) whether teaching a combination of these two types of strategies overwhelm the learners. We conducted an experiment including three conditions (N = 60 psychology undergraduates). All groups received modeling that taught strategies for applying text-structure knowledge. One group got no further support. Another group additionally received modeling of self-monitoring strategies. Finally, there was a group with additional modeling of text summarization strategies. Prior knowledge and learning outcomes were measured with a specially developed scale on writing competence. In addition, all participants wrote an abstract of an empirical article. We found that the self-monitoring group significantly outperformed the other two groups in academic writing competence and writing quality. Our findings indicate that it is of particular relevance to foster undergraduates' self-monitoring strategies in training interventions.

Q 17

29 August 2015 15:45 - 17:15

Room Yellow_G4

Paper Presentation

Technology-enhanced learning

Technology-enhanced learning and learning disabilities

Keywords: Mixed-method research,Educational technology,Interdisciplinary,Primary education,Computer-supported collaborative learning,Game-based learning,Case studies,Qualitative methods,Cultural diversity in school,Special education,Intelligence,Secondary education,Quantitative methods,Pre-service teacher education,Computer-assisted learning,Cognitive skills,Developmental processes,Literacy,Numeracy,Early childhood education

Sig's: SIG 15 - Special Educational Needs,SIG 7 - Learning and Instruction with Computers

Chairperson: Bas Giesbers, Rotterdam School of Management, Erasmus University, Netherlands

Learning while computer gaming? The impact of the uncertain reward

Mixed-method research,Educational technology,Interdisciplinary,Primary education,Computer-supported collaborative learning,Game-based learning

Skevi Demetriou, Cyprus University of Technology, Cyprus;

Computer games are a rapidly growing part of our culture and their impact on people of all ages and especially on youth is impressive. The potentially beneficial contribution of technological means and especially of computer games, on education and learning has been highly emphasised by educators and scholars worldwide. This is a study with 16 adults about the motivational properties of reward uncertainty and its impact on learning in an educational computer game. The study found that, for recall, reward prediction error prior to successful learning was significantly higher compared to prediction error prior to unsuccessful learning in adults. When repeated with fifty 10-11 year old children, the study found that on average, prediction error for successful learning was significantly higher than prediction error for unsuccessful learning with an effect (r) of medium size. Also, 8 children were asked to play the game collaboratively in dyads and the analysis of the dialogue produced revealed evidence of deep learning. The results of the study will be discussed from an educational perspective with reference to current concepts around cognition using an interdisciplinary approach.

Orbiting Two Worlds

Case studies,Qualitative methods,Cultural diversity in school,Special education,Intelligence,Secondary education

Emma Carter, University of Cambridge, United Kingdom;

My doctoral research investigates the question: What are the psychosocial experiences of Australian Aboriginal and other Black and Minority Ethnic (BME) young people involved in programmes aimed at developing ëgiftednessí? I acknowledge the contestability of the concept of ëgiftednessí, and its diverse cultural interpretations, but also recognise its wide usage within the UK and other international contexts. Typically, however, provision for ëgiftedí individuals tends to benefit white Anglo-Saxon rather than Black and Minority Ethnic (BME) students in the UK and Australia. My research explores the experiences of six young people, three from each of two programmes: (i) a London-based scheme for gifted BME students and (ii), a scheme for gifted Aboriginal students from rural Queensland, Australia. Methodologically, I have conducted ethnographic case studies of both programmes using semi-structured interviews, observations and documentary analysis of learning examples. In this paper, after presenting some contextual information, I shall concentrate on the stories from one student from each setting focusing mainly their interview data, supported by observational and documentary data as appropriate. Emergent issues include cultural conceptions of giftedness, the effects of the programme on the youngstersí sense of identity, teacher understanding of giftedness and the studentsí positive and negative experiences. Implications for research include the need for increased awareness amongst teachers of cultural factors influencing achievement and adjustment of gifted BME and Aboriginal students and the impact that new educational environments may have on their sense of identity.

Incorporating 21st century skills in a TPACK research instrument

Quantitative methods,Educational technology,Pre-service teacher education,Computer-assisted learning

Teemu Valtonen, University of Eastern Finland, Finland; Erkko Sointu, University of Eastern Finland, Finland; Kati Makitalo-Siegl, University of Eastern Finland, Finland; Arto Ahonen, University of Jyvaskyla, Finland; Piia Naykki, University of Oulu, Finland; Sanna Jarvela, University of Oulu, Finland; Paivi Hakkinen, University of Jyvaskyla, Finland;

The aim of this research is to modify an instrument for measuring Technological Pedagogical Content Knowledge (TPACK) to better take into account the aspects of 21st century skills. The context of the study is teacher education. This research reports the results from the first testing phase of the instrument targeted for 96 first year pre-service teachers. In order to investigate instrument properties, descriptive statistics, confirmatory factor analysis (CFA) and Rasch modeling were used. Results indicate good internal consistency of subscales although the fit indexes of CFA indicated that some items did not fit into the subscales as was theoretically considered. Also, based on Rasch modeling some statements seemed to be too easy, especially statements related to technological knowledge, and some too difficult, especially statements considering pedagogical areas. These results were used for building an updated version of the questionnaire.

Is intelligence relevant in reading ìmamaî and in calculating ì3 + 5î?

Cognitive skills,Developmental processes,Literacy,Numeracy,Early childhood education,Primary education

George Manolitsis, University of Crete, Greece; George Georgiou, University of Alberta, Canada;

We examined if intelligence ñ operationalized in terms of cognitive processes ñ could predict early reading and mathematics ability. Eighty-three Greek children were followed from the beginning of Kindergarten until the end of Grade 1. At the beginning of Kindergarten, they were assessed on Planning, Attention, Simultaneous, and Successive (PASS) processes, as well as on phonological awareness and visuo-spatial working memory. At the end of Kindergarten and Grade 1, they were assessed on reading and mathematics. The results indicated that successive processing and planning were unique predictors of reading ability. In contrast, none of the PASS processes accounted for unique variance in mathematics. Taken together, these findings suggest that in very young children the contribution of PASS cognitive processes is rather domain-specific. The PASS processes are less likely to contribute to a skill (i.e., mathematics) that has not yet been taught adequately at school and requires rote memorization of facts (i.e., addition).

Q 18

29 August 2015 15:45 - 17:15

Room Blue2_D2

Paper Presentation

Workplace learning

Workplace learning

Keywords: Content analysis,Qualitative methods,Teaching/instruction,Vocational education,Workplace learning,Learning in context,Quantitative methods,Social aspects of learning,Social sciences,Informal learning,Self-efficacy,Lifelong learning

Sig's: SIG 14 - Learning and Professional Development

Chairperson: Manuela Keller-Schneider, Zurich University of Teacher Education, Switzerland

Interplay of school- and work-based learning in the Icelandic dual VET system

Content analysis,Qualitative methods,Teaching/instruction,Vocational education,Workplace learning,Learning in context

Elsa Eiriksdottir, University of Iceland, Iceland; Jon Torfi Jonasson, University of Iceland, Iceland;

The goal of the research is to investigate the rationale and implications of the different variations of the VET dual system in Iceland. We analyzed the curricula for 34 certified trades in Iceland to get an overview of the requirements and organization of the dual system and found a wide variety of implementations, both in terms of the length of work-based learning, its timing and conditions for how work-based learning and school-based learning is integrated. There are valid pedagogical and economic arguments, for different implementations of the dual system, especially when it comes to emphasizing either work-based learning or school-based learning. It is important to consider these arguments openly, because the way in which the dual system tends to give priority to some of them at the cost of others. Interviews are conducted with teachers, trainers, and students in four certified trades (N = 36). The four trades were selected as being representative in terms of both duration of the work-based learning period and the integration of school- and work-based learning periods. The interviews focus on the arguments for different variations of the dual system and how these variations play out in practice. To reap the potential benefits of the dual system in VET it is necessary to consider the rationale and effects of the different ways in which the interplay of school- and work-based are arranged. The paper will present the curricular results and the initial analysis of the interviews.

Employees' conceptions of proactive informal learning from others

Quantitative methods,Social aspects of learning,Social sciences,Informal learning,Workplace learning

Dominik Froehlich, Maastricht University, Austria; Mien Segers, Maastricht University, Netherlands; Maike Gerken, Maastricht University, Netherlands; Simon Beausaert, Universite catholique de Louvain (UCL), Belgium;

Employees learn a lot from their colleagues. By seeking for help, feedback, and information, employees accumulate data which they may use to reflect about their practice. However, previous research has developed different conceptualizations of these learning activities and it is unclear whether employees are able to distinguish between them. Therefore, we investigate whether employees recognize the different ways in which they learn from others. Furthermore, we check whether similar patterns emerge across different organizations. Based on 782 employees' responses, we conduct exploratory and confirmatory factor analyses. The results show that respondents successfully distinguish between information, feedback, and help seeking. We showed that the concepts of help seeking, feedback seeking, and information seeking are discernible by respondents. This is important, since despite their differences, these forms of learning from others also share considerable amount of conceptual commonalities. Based on the finding that respondents still discriminate among the concepts, it is possible to investigate more deeply into the differences of the concepts. This will not only help to better assess learning in the workplace, but, due to the importance of learning from others for reflection, also contributes to building a reflective society.

Innovative work behavior in the social network: Effects of diversity and feedback seeking

Quantitative methods,Social aspects of learning,Informal learning,Workplace learning

Dominik Froehlich, Maastricht University, Austria; Jennifer Le Van, Maastricht University, Netherlands; Simon Beausaert, Universite catholique de Louvain (UCL), Belgium; Mien Segers, Maastricht University, Netherlands;

The rate of innovation in the business world is accelerating. This puts innovative work behavior (IWB) ñ employees' contributions to innovation development including the generation, promotion, and realization of ideas ñ on the agenda of managers. While previous research suggests that the frequency of feedback seeking and the diversity of relationships may affect idea generation and the innovation process, we do not sufficiently understand these relationships. In this study, we take a social network perspective to investigate how diversity in social ties in the workplace and employees feedback seeking affect IWB. This approach allows to study the relational demography of each dyad, i.e. the perspective that dyads may be between similar or dissimilar people. This permits more detailed conclusions about the effects of diversity on IWB. We studied 774 dyads in 4 organizations in Austria and Belgium. We find that both the frequency of feedback seeking and the demographic similarity explain which colleague employees address when they aim to generate, promote, or realize ideas. There is a tendency to connect to people that are similar to oneself. Overall, IWB may be improved by intervening into this process, for instance by assigning group work to employees that would otherwise rarely connect with each other.

Work agency and expertise development in the domain of geriatric care: A quantitative study

Quantitative methods,Self-efficacy,Informal learning,Workplace learning,Lifelong learning

Michael Goller, University of Paderborn, Germany; Christian Harteis, University of Paderborn, Germany;

Work agency is defined as the general capacity and disposition to make intentional choices, to initiate actions based on these choices and to exercise control over the professional self and the work environment. Although agency is been perceived as having power to explain learning at work empirical research is still scarce. No quantitative studies investigating the assumed relationship between work agency and professional development exist. Because of this research gap this study set out to investigate the assumed relationship by employing a quantitative approach. The following research questions guided this study: (1) How does agency as an individual-level characteristic explain employees' engagement in agentic efforts?, (2) How does the engagement in those efforts relate to the development of work-related expertise?, and (3) What organisational factors affect the engagement in agentic efforts? To answer those questions, data from 909 German geriatric care nurses was gathered using questionnaires. The data was used to estimate an empirically and theoretically derived research model. First results show that highly agentic individuals engage significantly more often in development-related agentic efforts (e.g., deliberate engagement in further education, reading professional literature, agentic job enlargement and enrichment). All of these agentic efforts were significantly and positively related to expertise. Furthermore, the study could show that autonomy, as well as strong coworker and supervisor support foster employees' engagement in development-related agentic efforts.

Q 19

29 August 2015 15:45 - 17:15

Room Brown_B8

Paper Presentation

Workplace learning

Workplace learning

Keywords: Content analysis,Social aspects of learning,Workplace learning,Learning in context,Qualitative methods,Competencies,Social interaction,Informal learning,Cooperative/collaborative learning,Emotion and cognition,Communities of learners,Computer-supported collaborative learning,Cultural psychology,Developmental processes,Professions and applied sciences,Knowledge creation

Sig's: SIG 14 - Learning and Professional Development

Chairperson: Campbell Reid, University of Strathclyde, United Kingdom

Between Two Advisors: Academic and Workplace Guidance in an Energy Efficiency Training Program

Content analysis,Social aspects of learning,Workplace learning,Learning in context

Kaisa Hytonen, University of Turku, Department of Teacher Education, Finland; Tuire Palonen, University of Turku, Finland; Kai Hakkarainen, University of Helsinki, Finland; Erno Lehtinen, University of Turku, Finland;

This study examines integration of academic and workplace guidance in professional education in the emerging field of energy efficiency. In order to address the requirements of future education in different professional fields, a model called Academic Apprenticeship Education was initiated in Finland in 2009. It aims to integrate learning within the framework of academic education and work that is needed when preparing professionals for future working settings in a changing world, especially in emerging fields. By interviewing 18 course participants of an energy efficiency training program, their 8 academic advisors and 8 workplace advisors, we examined 1) can integration of academic and workplace settings be embedded as part of the guidance process, 2) what are the pros and cons for having two advisors in different contexts, and 3) what are the factors behind successful guidance relationships between two advisors and a course participant. Even though the two advisors represented different perspectives, i.e. theoretical and practical, on energy efficiency, only few participants had intensive interaction with both of them. The results indicated that in most cases, academic and workplace context did not come across. A joint effect of several different factors related, e.g. to systematic guidance, clearly defined learning goals, and dedicated and competent advisors, made the guidance

relationships successful. This study contributes to extending our understanding of how workplace and academic settings can be interwoven together within a formal education.

The contextual determinants of feedback exchange in firemensí social network

Qualitative methods,Competencies,Social interaction,Informal learning,Workplace learning,Cooperative/collaborative learning

Julien Balasse, Universite catholique de Louvain (UCL), Belgium; Isabel Raemdonck, Universite Catholique de Louvain, Belgium; Simon Beausaert, Universite catholique de Louvain (UCL), Belgium;

The purpose of the present study was to make an in-depth analysis on the feedback exchange determinants inside firemen networks by interviewing 22 firemen who were identified earlier through 11 complete social network analyses of 175 firemen. Firemen that exchanged a lot or little feedback and with various profiles with regards to age, experience, education and rank were selected in order to have a heterogeneous sample. 22 semi-structured interviews were administered, addressing the participantsí exchange of feedback (feedback giving and seeking), network characteristics and psychological safety. The results indicated that firemenís professional development is promoted by the undertaking of training and the presence of informal networks of expertise. The participants highlighted the importance of having a heterogeneous network of expertise to easily access the information they need to perform their tasks well. Moreover, and in accordance with our first quantitative study, the interviews reveal different learning cultures and climates which influence the network structure and feedback exchange. Keywords: Informal learning, feedback giving, feedback seeking, social network characteristics, learning climate, learning culture, social network analysis.

Analysis of Emotional Communication Processes among Working Professionals within CoL

Content analysis,Emotion and cognition,Social interaction,Workplace learning,Communities of learners,Computer-supported collaborative learning

Verena Watzek, University of Regensburg, Germany; Martin Rehm, University of Duisburg-Essen, Germany; Regina Mulder, University of Regensburg, Germany;

Online Communities of Learning (CoL) have received a growing amount of attention in the context of Computer-Supported Collaborative Learning (CSCL). The process of connecting people via CoL builds on the use of technical media, e.g., asynchronous discussion forums. Online discussions are mainly fuelled by emotional support. Moreover, there is evidence that emotions have an impact on the individual learning processes. In order to emphasize the character of emotional communication processes in asynchronous learning environments, emotional threads, a newly developed and used method, has been used to analyse the dynamical structure of communication processes. Generally, each emotional thread involves at least two notes, is revealed in an online learning situation and has to be triggered by an external attribution. Previous research on this topic has focused on (higher) education and not yet on

working professionals. We address this shortcoming by formulating the following research questions: 1. Is it possible to identify emotional threads in asynchronous computer-supported collaborative learning? 2. To what extent are emotional threads relevant to the learning processes of CoL among working professionals? We collected data from an online training program (CoL = 25, n = 249), which aimed to enhance the knowledge and skills of a global organizationís staff, operating in the sector of economic development. Each CoL was centred on asynchronous discussion forums, where participants engaged in collaborative discussions of real-life tasks. Our preliminary findings include the identification of two task-directed emotional threads within one CoL.

Expansive learning and transformative agency: A Change laboratory intervention in a library

Qualitative methods,Cultural psychology,Developmental processes,Professions and applied sciences,Workplace learning,Knowledge creation

Juhana Rantavuori, Center for Research on Activity, Development and Learning CRADLE, Finland;

The paper presents an analysis of learning in an intervention in which the workers of an academic library, together with their clients, redefined the services the library offers to research groups. A specific intervention method, the Change Laboratory, was used to facilitate the generation of new ideas and procedures. This study is part of a research and development project taking place in the Helsinki University Library in 2009ñ2011. This developmental process is examined by using the theory of expansive learning by identifying expansive learning actions (questioning, analysis, modelling, examining, implementing, reflecting, consolidating the new practice) from the data. Next, expressions of transformative agency (resisting, criticizing, explicating, envisioning, committing to actions, taking actions) were identified. Finally, the relationship between learning actions and expressions of transformative agency is considered. In the analysis six of the seven expansive learning actions were identified in the Change Laboratory sessions. Most common actions were analysis and modelling. All six expressions of transformative agency were identified in the data. The most common expressions were explicating and envisioning. The strongest relationship was between the action of analysis and expressions of explicating and envisioning. Expression of resisting occurred mostly related to actions of analysis and questioning. One objective of this study is to develop a new methodology for analyzing learning during formative interventions.

Q 20

29 August 2015 15:45 - 17:15

Room Green_A5

Paper Presentation

Assessment methods and tools

Assessment methods and tools

Keywords: Quantitative methods,Assessment methods and tools,Competencies,Social aspects of learning,Secondary education,Motivation and emotion,Mixed-method research,Informal learning,Out-of-school learning,Integrated learning,Learning in context,Student learning,Attitudes and beliefs,Science education,Higher education,Case studies,Qualitative methods,Interdisciplinary

Sig's: SIG 1 - Assessment and Evaluation

Chairperson: Michalis Michaelides, University of Cyprus, Cyprus

The motivational impact of Assessment of Learning: A Self-Determination Theory perspective

Quantitative methods,Assessment methods and tools,Competencies,Social aspects of learning,Secondary education,Motivation and emotion

Christa Krijgsman, Utrecht University/ Ghent University, Netherlands; Greet Cardon, Ghent University, Belgium; Leen Haerens, Ghent University, Belgium; Lars Borghouts, Fontys University of Applied Sciences, Netherlands; Jolien Maes, Ghent University, Belgium;

Background. Assessment of Learning (AoL; assessment is deployed to measure achievement) is a generally accepted part of the educational system. However, little is known about how this affects studentsí motivational experiences, in the context of Physical Education (PE). Aim. Grounded in Self-Determination Theory, the present study investigated the differences in perceived competence satisfaction and frustration, quality of motivation and level of fear during a regular PE lesson when compared to a lesson in which no AoL took place. Differences between both lessons were also investigated according to studentsí grades. Methods. Thirty-eight teachers and 724 secondary school students completed validated questionnaires to measure studentsí perceived competence, motivation and fear after a regular lesson, and a second time after a lesson in which AoL was applied. Also, both students and teachers reported on the studentsí scores, on the way AoL took place and on the degree to which assessment for learning took place to be able to control for the latter. Multilevel regression analyses were deployed. Results. In general, students experienced less competence satisfaction and autonomous motivation, and on the other hand more competence frustration, controlled motivation, amotivation and fear in a lesson in which AoL was applied. Furthermore, low-achievers reported more feelings of competence frustration, amotivation and fear in a lesson in which AoL was applied, when compared to moderate- and high-achievers. Conclusions. The results of the present study suggest that an educational culture with continuous grading might come with a motivational cost. Implications for future research will be discussed.

Assessing after-school program quality for research and practice: Findings from a Swiss study

Mixed-method research,Assessment methods and tools,Informal learning,Out-of-school learning,Integrated learning,Learning in context

Michelle Jutzi, University of Zurich, Switzerland; Rebecca Mazur, University of Massachusetts, United States; Rebecca H. Woodland, University of Massachusetts, Amherst, United States;

The primary purpose of after-school programming (ASPs) is to bridge gaps in supervised care for children during traditional work hours outside the school day that augment school-day socio-emotional and academic learning through institutionalized and structured activities. Given the widespread delivery of ASPs, number of children served worldwide, and benefits they provide to society - it is essential that ASPs are empirically and systematically assessed for quality, impact, and continuous improvement. In this paper, we bring attention to the attributes and elements of effective after-school programming, issues of measurement validity and instrument application, and how working collaboratively cultivates synergy between learning, teaching, and research across international contexts. On the basis of data from 50 ASPs in Switzerland, we explore the combination of quality measurement tools with other mixed-methods approaches. By translating the After School Program Assessment System (APAS) (Miller & Surr 2013) to German, we can explore the value of a new approach to program quality assessment. Our results show that the APAS is a valid instrument to assess ASP quality internationally. A mixed-methods approach to ASP quality and the incorporation of items on collaboration quality, though, may paint a broader, more valid and accurate picture of After-School Program Quality. The APAS is a tool which captures program quality as a general concept as well as its different aspects. In order to be able to make concise and valid assumptions about the quality, the assessment tool must be closely aligned to the state level and national standards.

Developing a Multidimensional Instrument for Measuring Students' Epistemological Beliefs for Science

Quantitative methods,Student learning,Attitudes and beliefs,Science education,Higher education

Andreani Baytelman, University of Cyprus, Cyprus; Costas Constantinou, University of Cyprus, Cyprus;

This paper reports on the development of a valid and reliable instrument which measures the dimensions of epistemological beliefs (EB) of university education students toward science, called the Dimensions of Epistemological Beliefs toward Science (DEBS) Instrument. Although theoretical interest and empirical research in the area of EB have grown tremendously in the past years, key issues in this field are still not resolved. These issues concern the definition of EB, boundaries of the construct, and especially appropriate measurement and assessment. With the development of the DEBS Instrument, we sought to fulfill the need for a statistically and theoretically valid and reliable quantitative instrument to measure students' EB toward science. The DEBS Instrument is based on a comprehensive theoretical background for EB toward science. After a pilot test, the DEBS Instrument was revised and subsequently validated using a group of 200 university science education students. The theoretical underpinning of the DEBS Instrument combined with the statistical data indicate that the DEBS possesses good construct validity and internal consistency and that it proves to be a promising instrument that can be used

in applied and in research settings related to EB toward science. Therefore, it can make a valuable contribution within the field of science education. Keywords: Epistemological beliefs instrument, University science education students, Instrument validation, Science education.

Designing and implementing effective assessment tasks

Case studies,Qualitative methods,Assessment methods and tools,Student learning,Interdisciplinary,Higher education

David Carless, University of Hong Kong, Hong Kong;

The aim of this paper is to analyze assessment task design and implementation in the practices of five recipients of teaching awards from different disciplines. The main research question is: How is assessment designed and managed by selected award-winning teachers? Research methods involved classroom observations and semi-structured interviews with participating teachers in Architecture, Business, Geology, History and Law. The important student voice in assessment is elicited through and individual interviews with 51 students who attended the classes of the award-winning teachers. The findings and significance of the paper lie in the development of a set of principles for assessment task design which are not just recipes for good practice, but are grounded in their implementation across multiple disciplines. Good assessment task design facilitates persistent intellectual engagement through a series of well-designed tasks; involves students in ways of thinking and practicing in the discipline by mirroring real-life uses of the subject; permits student choice and personal investment so that students develop ownership of assessment; and engineers regular feedback dialogues in relation to tasks and work in progress.

Q 21

29 August 2015 15:45 - 17:15

Room Cyan_F2

Paper Presentation

Assessment methods and tools

Assessment methods and tools

Keywords: Action research,Case studies,Design based research,Quantitative methods,Assessment methods and tools,Instructional design,Psychometrics,Pre-service teacher education,Competencies,Science education,Educational technology,Achievement,Cognitive skills,Reasoning,Qualitative methods

Sig's: SIG 1 - Assessment and Evaluation,SIG 27 - Online Measures of Learning Processes

Chairperson: Bridget Dever, Lehigh University, United States

Developing life-long learning: The design of learning assignments in transfer skills

Action research,Case studies,Design based research,Quantitative methods,Assessment methods and tools,Instructional design

Irit Sasson, Tel Hai Academic College, Israel; Judy Dori, Technion, Israel;

In an era in which information is rapidly growing and changing, it is very important to teach with the goal of students' engagement in life-long learning in mind. This can partially be achieved by developing transferable thinking skills. Transfer refers to students' ability to apply knowledge and skills in new learning contexts. We formulated a theoretical transfer framework that distinguishes between near and far transfer. The framework consists of three attributes: task distance, interdisciplinarity, and skills set. The goal of this research was to explore the applicability of the three-attribute transfer skills framework in the design of the transfer assignments as a tool to assess the development in students' skills. About 670 chemistry 12th grade honor students from 24 high schools in Israel participated in the research. The students learned a special program in a computerized laboratory setting. Findings indicated an increase in students' far transfer skill as expressed by the progress students made in transferring knowledge from chemistry to other science domains and by using more chemistry understanding levels in their responses. The research demonstrates the use of the theoretical framework as a tool to mediate between theory and practice, the framework provides a unique interface between researchers and teachers in science education. Teachers may become ëexpertsí by serving as designers of learning environments by producing their own transfer assignments. They can use this method to conduct ëaction researchí to investigate the relationships between their pedagogical choices and their studentsí learning outcomes.

Validation of a large-scale test measuring pre-service science teachers' scientific reasoning skills

Psychometrics,Quantitative methods,Assessment methods and tools,Pre-service teacher education,Competencies,Science education

Stefan Hartmann, Humboldt-Universitat zu Berlin , Germany;

The aim of this study was to initially validate a multiple-choice test which was developed to evaluate the development of pre-service science teachers' scientific reasoning skills. Three hypotheses regarding differences between extreme groups were tested. A sample of 2156 academic students in teacher education programs participated on the study. The test contained 123 multiple-choice items that were assigned to test booklets using a balanced incomplete block design. A two-parametric IRT model was used to estimate the students' abilities. To minimize the impact of possible confounding effects on the results, propensity score matching was applied to the sample prior to the analysis of group differences. As predicted, students at the end of academic training performed higher than students at the beginning, students who study two natural sciences performed higher than students who study only one natural science, and students who attended seminars in which scientific reasoning is taught explicitly performed higher than students who did not attend such seminars. The evidence found in this study provides support for

the criterion-based validity of our interpretation of the test scores as measures of scientific reasoning competencies.

Online Assessment of Combinatorial Reasoning: Perspectives of Measuring a Challenging Construct

Quantitative methods,Assessment methods and tools,Educational technology,Achievement,Cognitive skills,Reasoning

Beno Csapo, University of Szeged, Hungary; Attila Pasztor, University of Szeged, Hungary; Gyongyver Molnar, University of Szeged, Hungary;

This paper presents results from the development of an online test for assessing combinatorial reasoning using innovative item formats and automated scoring. The objectives of the study are to analyze the psychometric characteristics of the online instrument, examine age and gender differences, and explore the possibilities of further analyses. The sample was drawn from students in third (N=186) and fourth (N=219) grades. An online test was developed based on a former paper-and-pencil test that measured a number of operations of combinatorial reasoning with two types of content (formal content with letters and numbers and figural content with pictures). Online data collection was carried out by means of the eDia (Electronic Diagnostic Assessment) platform. Students entered their responses by keyboard (formal content) or by dragging and dropping figures on the screen with a mouse (figural content). The reliability indices for the test were good (Cronbachís ? = .84 for figural and .88 for figural and formal items). Mplus was used to analyze model fit and scale invariance; the results provided evidence of the testís construct validity. Grade and gender differences were found: girls achieved significantly better test scores than boys, and fourth graders performed better than third-grade students. The differences between the third and fourth graders indicate that there may be structural differences between younger and older childrenís thinking skills. The findings indicate that online assessment may provide teachers with an easy-to-use instrument for monitoring the development of studentsí combinatorial reasoning.

Computer-based assessment of creativity: The case of divergent thinking

Qualitative methods,Assessment methods and tools,Educational technology,Achievement,Cognitive skills,Reasoning

Attila Pasztor, University of Szeged, Hungary; Gyongyver Molnar, University of Szeged, Hungary; Beno Csapo, University of Szeged, Hungary;

The purpose of this study is to explore the possibilities of technology-based assessment of divergent thinking and to contribute to the development of a reliable online instrument. The sample for the study was drawn from sixth-grade students (N=917). The computerized instrument comprised six tasks and was based on Torranceís and Wallach and Koganís item types for divergent thinking. Answers were scored by the scales of fluency, flexibility and originality. The online data collection was carried out by the eDia platform via Internet in schoolsí ICT rooms. The comparison was made between the respondent database and the

database with the categorized answers using a computer program which calculated the three indices automatically. The online assessment tool proved to be reliable (Cronbachís alpha ranged between .80 and .87). Correlation patterns between verbal and figural subtests provided empirical evidence for the convergent and discriminant validity. The three-dimensional model based on fluency, flexibility and originality fit the data better than the one-dimensional model (Chi-square=972.54, df=3 p.001), thus factors of divergent thinking distinguished in paper-and-pencil testing could be empirically distinguished in a computer-based environment as well. Within the three-dimensional model, all three dimensions correlated on a latent level (r_flu_fle=.61, r_flu_or=.65, r_fle_or=.80, p.001). Online test administration and automatic scoring reduced time and cost of the testing process and made the assessment tool suitable for everyday school practice and large-scale assessments. However, further research is necessary to make the instrument fully automated.